# REMOVAL PRELIMINARY ASSESSMENT

## DRY DOCK 4 (IR-57) DRAINAGE CULVERT NETWORK AT HUNTERS POINT ANNEX, SAN FRANCISCO, CALIFORNIA

HUNTERS POINT ANNEX
SAN FRANCISCO, CALIFORNIA

Prepared by EFA West

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DRAINAGE CULVERT NETWORK

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# EXECUTIVE SUMMARY

This Removal Preliminary Assessment (RPA) was performed in accordance with current US Environmental Protection Agency (US EPA) and US Navy guidance documents. It was prepared for a time critical removal action under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). This RPA summarizes the results of the RPA process, characterizes the site, identifies removal action objectives, describes removal action alternatives, contains analysis of these alternatives, and describes the recommended removal action alternative.

Previous documents issued for actions at Dry Dock 4 at Hunters Point Annex incorrectly referred to the drainage culverts as tunnels and the dry dock floor gutters as troughs. To ensure consistency between the existing dry dock construction documents and this RPA and to prevent misunderstanding in the work force, the terms culverts and gutters will be used herein.

During normal dry dock operations the drainage culvert network of Dry Dock 4 at Hunters Point Annex accumulated extensive quantities of sediment and debris. The drainage culvert network consists of approximately 2,100 feet of two and four foot diameter culverts. The sediments vary in depth along the length of the culverts. A small portion of the culverts has no sediments present while approximately one third of the culverts length is completely filled. The sediments are primarily made up of abrasive blast material (ABM), which was routinely used in the overhaul and repair of Navy ships and submarines. Smaller amounts of other industrial debris such as wood, rubber, metal, stones, are also in the sediment.

These deposits contain soluble heavy metals at concentrations which may pose a threat to the environment. The sediments normally contact the water in the dry dock during normal operations. For this reason the sediments have been isolated by temporarily sealing the culverts. Sediments from adjoining sumps were characterized as non hazardous waste during previous investigations. Even though the sediments were characterized as non hazardous waste by state and federal standards, they contain heavy metals which may pose a threat to the environment.

The purpose of this RPA is to identify and analyze alternative actions to eliminate the release or threat of release of contamination from the sediments to the environment. Two alternatives were identified and considered as follows:

1. Remove only a minimal amount of sediment from the culverts and permanently seal the remaining sediment in place with grout.

2. Remove the sediments from the culverts and wash down all surfaces to return the culverts to their original condition.

Based on this analysis, the Navy recommends Alternative #2. This alternative best meets the criteria of overall protection to human health and the environment, compliance with applicable or relevant and appropriate requirements (ARARs), long term effectiveness, implementability, cost, and state and community acceptance.

Alternative #2 will physically remove the sediments and debris and will dispose of them off site.

# CONTENTS

# LIST OF ACRONYMS

| | |
|---|---|
| ABM | Abrasive Blast Material |
| ARAR | Applicable or Relevant and Appropriate Requirement |
| BGS | Below Ground Surface |
| CCR | California Code of Regulations |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CFR | Code of Federal Regulations |
| DTSC | Department of Toxic Substance Control |
| EBS | Environmental Baseline Survey |
| EFA West | Engineering Field Activity West |
| EPA | Environmental Protection Agency |
| ESAP | Environmental Sampling and Analysis Plan |
| HBR | Historic Building Registry |
| HHRA | Human Health Risk Assessment |
| HPA | Hunters Point Annex |
| HSP | Health and Safety Plan |
| IR | Installation Restoration |
| mg/kg | Milligrams per Kilogram (PPM) |
| mg/l | Milligrams per Liter(PPM) |
| MINS | Mare Island Naval Shipyard |
| MLLW | Mean Lower Low Water |
| MSL | Mean Sea Level |
| NCP | National Oil and Hazardous Substances Pollution Contingency Plan |
| NOAA | National Oceanic and Atmospheric Administration |
| NPDES | National Pollutant Discharge Elimination System |
| NPL | National Priority List |
| NRHP | National Register of Historic Places |
| PCB | Polychlorinated Biphenyl |
| PPB | Parts per Billion |
| PPM | Parts per Million |
| PRC | PRC Environmental Management Inc. |
| PWC | Navy Public Works Center, San Francisco Bay |
| RCRA | Resource Conservation and Recovery Act |
| RPA | Removal Preliminary Assessment |
| RWQCB | Regional Water Quality Control Board |
| SAP | Sampling Analysis Plan |
| STLC | Soluble Threshold Limit Concentration |
| TBC | To Be Considered |
| TCLP | Toxicity Characteristic Leaching Procedure |
| TPH | Total Petroleum Hydrocarbon |
| TTLC | Total Threshold Limit Concentration |

| | |
|---|---|
| ug/kg | Micrograms per Kilogram (PPB) |
| ug/l | Micrograms per Liter (PPB) |
| US EPA | United States Environmental Protection Agency |
| USC | United States Code |
| WET | California Waste Extraction Test |

# LIST OF FIGURES



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# SECTION 1.0 - INTRODUCTION

## REMOVAL PRELIMINARY ASSESSMENT
## DRY DOCK 4 (IR-57)
## DRAINAGE CULVERT NETWORK

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# 2.0 SITE CHARACTERIZATION

## 2.1 SITE DESCRIPTION AND BACKGROUND

### 2.1.1 SITE LOCATION

Hunters Point Annex is located in the south eastern portion of the County and City of San Francisco along San Francisco Bay, see Figure 1. The naval annex is located on a rocky peninsula which extends about one mile out into the deep waters of San Francisco Bay. The geographic location and waterfront characteristics of HPA are favorable for shipyard operations. These characteristics include a protected harbor afforded by San Francisco Bay, an unrestricted approach channel with relatively deep water, 60 feet below mean lower low water (MLLW), and a large off shore anchorage area.

The location of Dry Dock 4 is shown on Figure 2. This RPA is concerned only with the drainage culverts of Dry Dock 4, per Ref 10. Dry Dock 4 is identified as Installation Restoration Site (IR)-57 due to the presence of contaminated abrasive blast material. The drainage culvert network consists of approximately 2100 feet of four foot diameter culvert, see Figure 3. There are two main culverts which run the length of the dry dock and connect to the main dewatering sumps at the mouth of the dry dock. There are also cross culverts and other short culverts which connect various sumps. Longitudinal drainage gutters on the dry dock floor are above the longitudinal culverts and are connected to the culverts every 24 feet by drains. This arrangement of intersecting culverts and gutters allow workers to wash sediment and small particles of industrial waste to the nearest drainage point and speeds up the cleaning of the dry dock floor.

### 2.1.2 TYPE OF FACILITY AND OPERATIONAL STATUS

Hunters Point was first established as a commercial ship repair facility in 1869. In 1939 the Navy purchased two dry docks and 48 acres of land at Hunters Point. In 1941 operational control of the facility was granted to Mare Island Naval Shipyard (MINS). Dry Dock 4 was constructed in 1942 and since that time HPA has grown to approximately 515 acres of dry land. Another 443 acres of submerged land is encompassed by HPA.

The facility separated from MINS and was designated United States Naval Shipyard, Hunters Point. The shipyard was used by the Navy from 1945 until deactivation in 1974. Since that time the facility has been used by commercial interests and by the Navy for industrial and ship repair activities.

Currently the facility is under the jurisdiction of Engineering Field Activity West, Naval Facilities engineering Command (EFA West) and is being leased to commercial interests for ship repair and deactivation activities. The latest tenant Astoria Metals is currently using Dry Dock 4 for docking Navy and private vessels for conversion and scrapping.

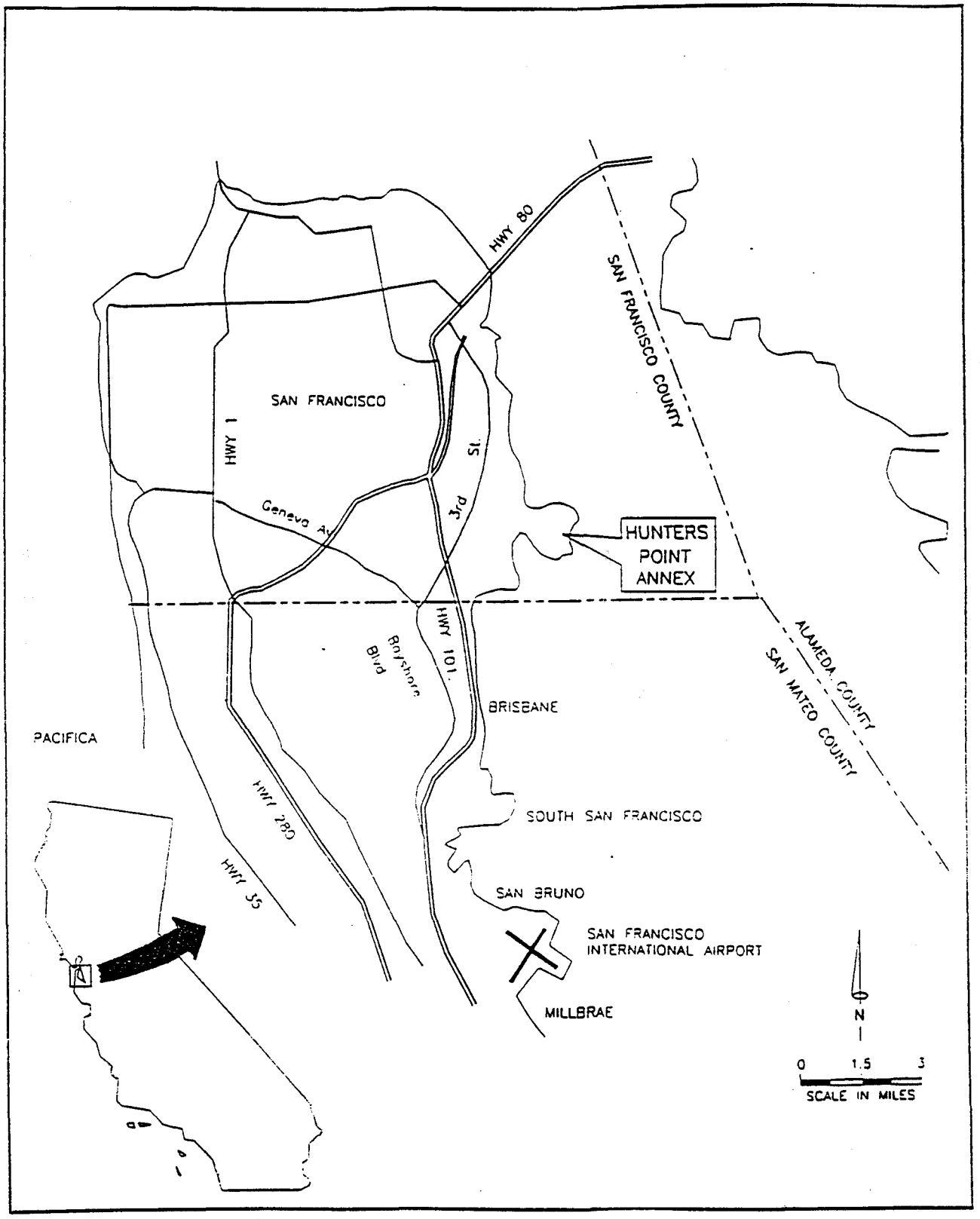



**Figure 1 - General Location**

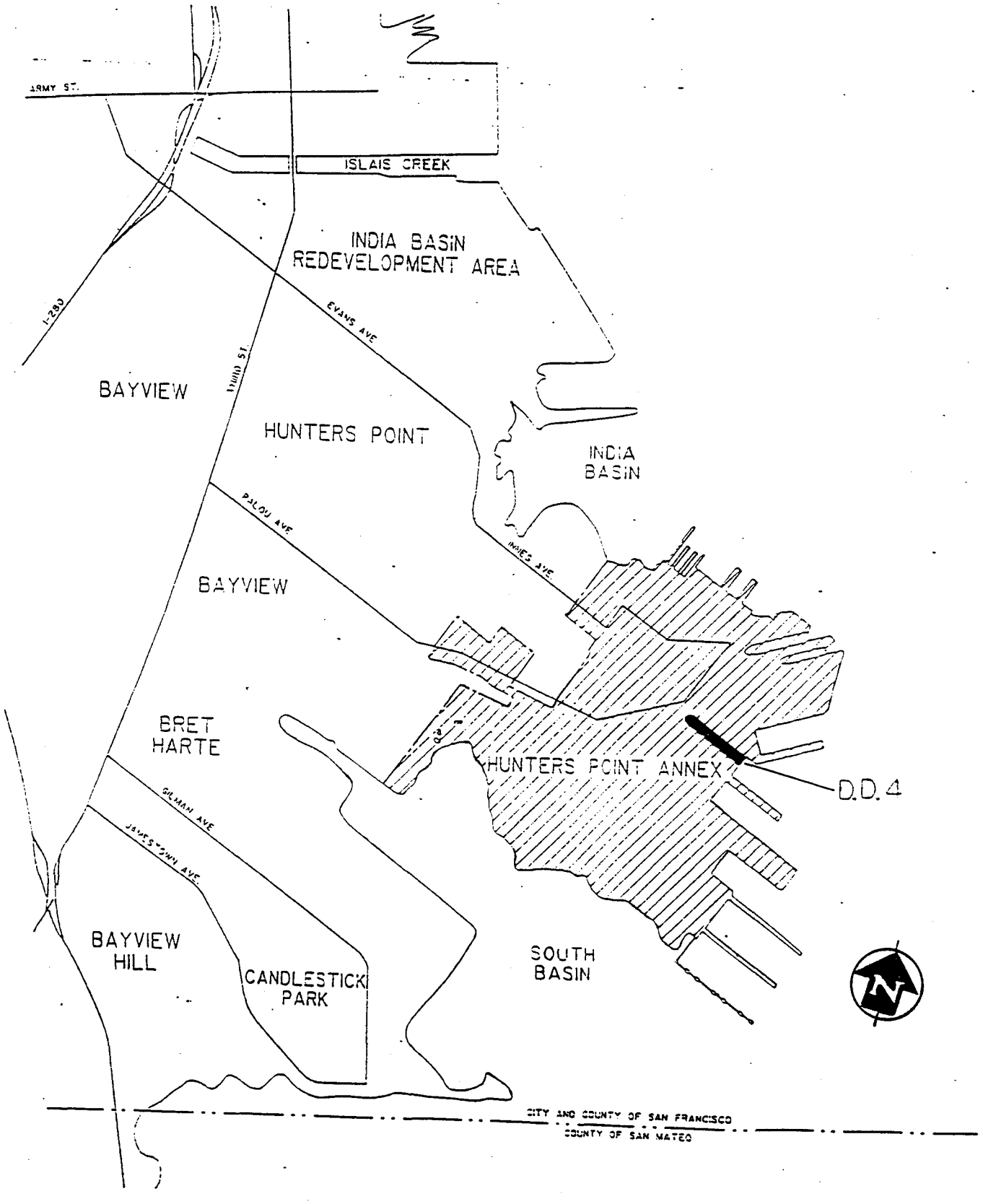
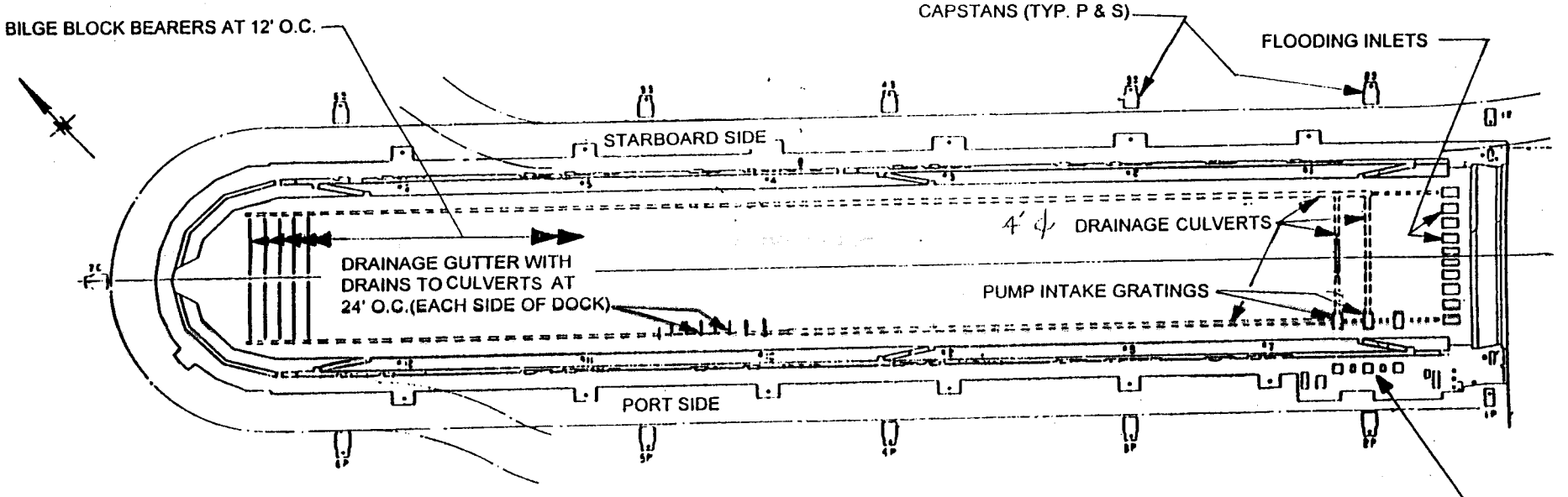



**Figure 2 - Local Area**




**PLAN VIEW DRY DOCK NO. 4**

NOT TO SCALE

**Figure 3**

# SECTION 2.0 – SITE CHARACTERIZATION
# SECTIONS 2.1.3 AND 2.1.4

## REMOVAL PRELIMINARY ASSESSMENT
## DRY DOCK 4 (IR-57)
## DRAINAGE CULVERT NETWORK

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The area around Dry Dock 4 consists of a shallow soil fill covering bedrock. Ground water in this area is restricted to fractures within the bedrock. No groundwater is present in the surface soils in this area.

## 2.1.5 SURROUNDING LAND USE AND POPULATIONS

Surrounding land use at HPA is varied, including heavy and light industrial, office space, and open space. Most of the industrial activity is located on the east side of the facility; the west side is mostly open space.

The City of San Francisco, with a current population of approximately 753,000, is located adjacent to the northwest edge of HPA. San Francisco is a diverse city with residential, commercial, retail, industrial, and business centers at various locations within the city. The rest of the facility is surrounded by San Francisco Bay waters.

## 2.1.6 SENSITIVE ECOSYSTEMS

Dry Dock 4 is located on the western shore of San Francisco Bay. Aquatic populations in these waters may be affected if contaminants were to be discharged from the dry dock water during normal operations.

Since the area around Dry Dock 4 and the dock itself are completely covered with concrete or asphalt, no sensitive ecosystems are located directly adjacent to the dry dock.

## 2.1.7 METEOROLOGY

Hunters Point is located in the West Coast climate zone, which is characterized by relatively cool wet winters and warm dry summers. The average annual rainfall is less than 20 inches, with approximately 85 percent of the precipitation falling from November to March in the form of frontal storm activity. The area is cloudy about 25% of the year. Coastal fog plays an important role in providing moisture for vegetation during the dry season. During this period, the relative humidity averages 65 percent in the morning hours and approximately 60 percent in the afternoon hours. Winter period relative humidity readings are approximately 80 percent during the morning hours, dropping to near 65 percent in late afternoon.

Temperatures for the year average 56 degrees Fahrenheit (°F). The mean summer temperature is approximately 62°F. The winter temperature extremes occasionally fall below the freezing point. The frost-free season last about 10 months. The mean winter temperature is approximately 50°F.

The prevailing wind direction is westerly coming through the Golden Gate. Winds are generally light, less than 15 miles per hour, but will occasionally reach in excess of 30 miles per hour with the proper atmospheric conditions.

## 2.2 HISTORY OF PREVIOUS REMOVAL ACTIONS AND INVESTIGATIONS

### 2.2.1 PREVIOUS ACTIONS

During January and February of 1995 the drainage culverts were temporarily isolated. This was accomplished by blanking the drains leading into the culverts with steel plates and installing inflatable bladders at the end of the culverts. Sediments in the inlet and dewatering sumps were removed. The work instructions for this effort, Ref. 11, dated January 11, 1995, describe this work as a maintenance activity. This is the only action that has been taken to alleviate the present situation.

### 2.2.2 PREVIOUS INVESTIGATIONS

Between 1986 and 1988 a plan was developed and implemented to characterize soil and ground water at HPA. Based on the results of investigations conducted, HPA was added to the National Priority List (NPL). The dry dock was later identified as Installation Restoration Site 57 (IR-57) by EFA West.

Several sampling efforts on HPA and in San Francisco Bay adjacent to HPA have been conducted. The National Oceanic and Atmospheric Administration (NOAA) prepared a summary report on contaminants in the entire San Francisco Bay in 1988 (reference 12). Aqua Terra Technology conducted an Environmental Sampling and Analysis Plan (ESAP) in 1991 (reference 1). PRC Environmental Management Inc. (PRC) conducted soil sampling for the areas around Dry Dock 4 in support of the human health risk assessment (HHRA) (reference 18).

## 2.3 SOURCE, NATURE AND EXTENT OF CONTAMINATION

### 2.3.1 SOURCE OF CONTAMINATION

The sediments in the drainage culverts are contaminated with abrasive blast material (ABM) and other materials associated with dry dock operations. During normal dry dock operations these materials along with mud and silt have been washed into the drainage culvert network. The water flow through the culverts is not sufficient to keep these particles in suspension and effectively wash them out of the culverts. Over the years these particles have settled and have built up deposits in the culverts.

### 2.3.2 NATURE OF CONTAMINATION

The contamination of concern at this site is heavy metals associated with paint flakes from abrasive blasting operations. A portion of these heavy metals are soluble and may contaminate water entering the dry dock .

During the previous culvert isolation action, sediment was removed from the de-watering sumps and from a portion of the drainage culvert network. Some of the sediments had sufficiently solidified to require a jack hammer to break through the upper crust. The material below the upper crust was able to be removed using hand tools. Samples were taken of the material to characterize it for disposal (reference 9). The following metals were identified during the sampling effort; arsenic, barium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, vanadium, and zinc.

### 2.3.3 EXTENT OF CONTAMINATION

Of the approximately 2100 feet of drainage culvert, about 750 feet are completely filled with sediment, about 750 feet are more than one half full to completely full, and the remaining 600 feet are less than one half full. The total capacity of the drainage culvert network is approximately 990 cubic yards. The estimated quantity of material to be removed from the drainage culvert network is 710 cubic yards.

In some areas where the drainage culvert is completely full the sediments have also filled the drains leading into the culverts. A portion of the gutters above the culverts are also partially filled with sediments.

## 2.4 ANALYTICAL DATA

The following sections quantify the volume of sediment present in the drainage culverts and provide the most recent sampling information available. Some previous sampling activities are also discussed. This section also assesses the quality control measures and apparent accuracy of the data.

### 2.4.1 VOLUME OF SEDIMENT PRESENT

The station numbers correspond to drainage culvert drains from the dry dock gutters. The numbering starts at the caisson end of the dock and proceeds to the head of the dock. The drains from the gutters to the drainage culverts are located at 24 foot intervals along the gutters. The south drainage culvert empties into the de-watering sumps and therefor does not have drains at the caisson end of the dock. The cross culvert which connects the north and south longitudinal culverts is located at station number 3. The depths shown are in inches from the bottom of the culvert to the surface of the sediments.

**Table 1**

**Culvert Sediment Depth in Inches**

| Station Number | North Culvert | South Culvert | | Station Number | North Culvert | South Culvert |
|---|---|---|---|---|---|---|
| 1 | Full | -- | | 22 | 39 | 24 |
| 2 | 29 | -- | | 23 | 45 | 24 |
| 3 | 24 | -- | | 24 | Full | 30 |
| 4 | 20 | -- | | 25 | Full | 30 |
| 5 | 20 | 0 | | 26 | Full | 33 |
| 6 | 21 | 0 | | 27 | Full | 36 |
| 7 | 24 | 0 | | 28 | Full | 39 |
| 8 | 24 | 6 | | 29 | Full | Full |
| 9 | 30 | 12 | | 30 | Full | Full |
| 10 | 30 | 12 | | 31 | Full | Full |
| 11 | 30 | 9 | | 32 | Full | Full |
| 12 | 30 | 12 | | 33 | Full | Full |
| 13 | 27 | 12 | | 34 | Full | Full |
| 14 | 30 | 15 | | 35 | Full | Full |
| 15 | 30 | 18 | | 36 | Full | Full |
| 16 | 36 | 18 | | 37 | Full | Full |
| 17 | 36 | 18 | | 38 | Full | Full |
| 18 | 42 | 24 | | 39 | Full | Full |
| 19 | 42 | 24 | | 40 | Full | Full |
| 20 | 42 | 24 | | 41 | Full | Full |
| 21 | 40 | 24 | | 42 | Full | Full |

## 2.4.2 CULVERT SAMPLING INFORMATION

Samples were taken and analyzed in accordance with the work instruction (reference 21). Sixteen total samples were taken from the two longitudinal culverts in the dry dock. Each two adjacent samples were composited to form one sample. Four samples were thus analyzed from each culvert resulting in eight total samples analyzed.

Special instructions given to the lab performing the tests were as follows: perform the STLC only if TTLC is ten times greater than STLC limits and constituent did not fail TTLC. Please use de-ionized water instead of acid for extraction of metals by WET method. Perform TCLP only if TTLC is twenty times greater than TCLP limits. A number of tests were performed on the samples, including analyzing for metals, total petroleum hydrocarbons (TPH), PCBs, and a variety of other organics. Analysis for Title 22 metals was conducted using a total digestion method. Samples #2, #3, and #5 were also analyzed using a standard WET test and a D. I. WET test.

Table 2 lists the results of the total metals analysis that was performed for each sample (also see appendix B) and compares the results with the regulatory levels established for Total Threshold Limit Concentration (TTLC) (reference 2). This regulatory level is one criteria used to characterize the waste for disposal.

The WET analysis performed on samples #2, #3, and #5 using both acid and de-ionized water provided the Soluble Threshold Limit Concentration (STLC) values that might be expected under land fill conditions and also when in the culverts in Dry Dock 4. These results are also shown in Table 2. The standard WET test regulatory level is one criteria used to characterize the waste for disposal.

Table 3 lists the analysis results for the TPH, PCBs, and other organics. Only the organics that were found are listed. For a complete listing of the results see Appendix B.

**Table 2**

**Total Metal Concentrations for Culvert Sampling**

All concentrations are in mg/kg (PPM)

| Analyte | Culvert Sample #1 (0444-96) | TTLC Regulatory Level | WET Test NOT DONE | | STLC Regulatory Level |
|---|---|---|---|---|---|
| | Max conc. | | Std | D.I. | |
| Antimony | ND | 500 | | | 15 |
| Arsenic | 7.12 | 500 | | | 5.0 |
| Barium | 380 | 10,000 | | | 100 |
| Beryllium | ND | 75 | | | 0.75 |
| Cadmium | 2.1 | 100 | | | 1.0 |
| Chromium (Total) | 222 | 500* | | | 5* |
| Cobalt | 8.2 | 8,000 | | | 80 |
| Copper | 4600 | 2,500 | | | 25 |
| Lead | 644 | 1,000 | | | 5.0 |
| Mercury | 2.42 | 20 | | | 0.2 |
| Molybdenum | 33.7 | 3,500 | | | 350 |
| Nickel | 135 | 2,000 | | | 20 |
| Selenium | ND | 100 | | | 1.0 |
| Silver | ND | 500 | | | 5 |
| Thallium | ND | 700 | | | 7.0 |
| Vanadium | 26.7 | 2,400 | | | 24 |
| Zinc | 1450 | 5,000 | | | 250 |

* This is for Chromium (VI) compounds, for Chromium (III) compounds use 5 & 2,500.

ND denotes not detected

**Table 3**

**Various Contaminant Concentrations**

| Analyte | Culvert Sample | | Regulatory Level |
|---|---|---|---|
| | max conc. | avg conc. | |
| TPH | 434 | NA | NL |
| PCBs[1] | 1O40* | NA | 50[2] mg/kg TTLC<br>5[2] mg/kg STLC |
| See Appendix B for a list of organic compounds analyzed for | | | |

[1] Includes Aroclor 1016, 1221, 1232, 1242, 1248, 1254, *1260, and 1262.

[2] From Table III of 22 CCR §66261.24(a)(2).

ND denotes not detected

NL denotes no listed regulatory level

## Table 2

### Total Metal Concentrations for Culvert Sampling

All concentrations are in mg/kg (PPM)

| Analyte | Culvert Sample #2 (0445-96) | TTLC Regulatory Level | WET Test | | STLC Regulatory Level |
|---|---|---|---|---|---|
| | Max conc. | | Std | D.I. | |
| Antimony | ND | 500 | | | 15 |
| Arsenic | 17.4 | 500 | | | 5.0 |
| Barium | 202 | 10,000 | | | 100 |
| Beryllium | ND | 75 | | | 0.75 |
| Cadmium | 1.9 | 100 | | | 1.0 |
| Chromium (Total) | 75 | 500* | ND | ND | 5* |
| Cobalt | 17.6 | 8,000 | | | 80 |
| Copper | 1790 | 2,500 | ND | ND | 25 |
| Lead | 74.1 | 1,000 | ND | ND | 5.0 |
| Mercury | ND | 20 | | | 0.2 |
| Molybdenum | 64.3 | 3,500 | | | 350 |
| Nickel | 38.3 | 2,000 | | | 20 |
| Selenium | ND | 100 | | | 1.0 |
| Silver | ND | 500 | | | 5 |
| Thallium | ND | 700 | | | 7.0 |
| Vanadium | 30.8 | 2,400 | | | 24 |
| Zinc | 830 | 5,000 | | | 250 |

* This is for Chromium (VI) compounds, for Chromium (III) compounds use 5 & 2,500
ND denotes not detected

## Table 3

### Various Contaminant Concentrations

| Analyte | Culvert Sample | | Regulatory Level |
|---|---|---|---|
| | max conc. | avg conc. | |
| TPH | 90 | ND | NL |
| PCBs[1] | 483* | ND | 50[2] mg/kg TTLC<br>5[2] mg/kg STLC |
| See Appendix B for a list of organic compounds analyzed for | | | |

[1] Includes Aroclor 1016, 1221, 1232, 1242, 1248, 1254, *1260, and 1262.
[2] From Table III of 22 CCR §66261.24(a)(2).
ND denotes not detected
NL denotes no listed regulatory level

## Table 2

### Total Metal Concentrations for Culvert Sampling

All concentrations are in mg/kg (PPM)

| Analyte | Culvert Sample #3 (1446-96) | TTLC Regulatory Level | WET Test | | STLC Regulatory Levels |
|---|---|---|---|---|---|
| | Max conc. | | Std | D.I. | |
| Antimony | ND | 500 | | | 15 |
| Arsenic | 31.8 | 500 | | | 5.0 |
| Barium | 301 | 10,000 | | | 100 |
| Beryllium | ND | 75 | | | 0.75 |
| Cadmium | 3.6 | 100 | | | 1.0 |
| Chromium (Total) | 95.9 | 500* | ND | ND | 5* |
| Cobalt | 27.3 | 8,000 | | | 80 |
| Copper | 2390 | 2,500 | ND | ND | 25 |
| Lead | 127 | 1,000 | ND | ND | 5.0 |
| Mercury | ND | 20 | | | 0.2 |
| Molybdenum | 293 | 3,500 | | | 350 |
| Nickel | 80.4 | 2,000 | | | 20 |
| Selenium | ND | 100 | | | 1.0 |
| Silver | ND | 500 | | | 5 |
| Thallium | ND | 700 | | | 7.0 |
| Vanadium | 33.7 | 2,400 | | | 24 |
| Zinc | 748 | 5,000 | | | 250 |

* This is for Chromium (VI) compounds, for Chromium (III) compounds use 5 & 2,500

ND denotes not detected

## Table 3

### Various Contaminant Concentrations

| Analyte | Culvert Sample | | Regulatory Level |
|---|---|---|---|
| | max conc. | avg conc. | |
| TPH | 127 | ND | NL |
| PCBs[1] | 131* | ND | 50[2] mg/kg TTLC<br>5[2] mg/kg STLC |
| See Appendix B for a list of organic compounds analyzed for | | | |

(1) Includes Aroclor 1016, 1221, 1232, 1242, 1248, 1254, *1260, and 1262.

(2) From Table III of 22 CCR §66261.24(a)(2).

ND denotes not detected

NL denotes no listed regulatory level

## Table 2

### Total Metal Concentrations for Culvert Sampling

All concentrations are in mg/kg (PPM)

| Analyte | Culvert Sample #4 (0447-96) | TTLC Regulatory Level | WET Test NOT DONE | | STLC Regulatory Levels |
|---|---|---|---|---|---|
| | Max conc. | | Std | D.I. | |
| Antimony | ND | 500 | | | 15 |
| Arsenic | 8.60 | 500 | | | 5.0 |
| Barium | 451 | 10,000 | | | 100 |
| Beryllium | ND | 75 | | | 0.75 |
| Cadmium | 6.4 | 100 | | | 1.0 |
| Chromium (Total) | 103 | 500* | | | 5* |
| Cobalt | 30.0 | 8,000 | | | 80 |
| Copper | 3320 | 2,500 | | | 25 |
| Lead | 232 | 1,000 | | | 5.0 |
| Mercury | ND | 20 | | | 0.2 |
| Molybdenum | 293 | 3,500 | | | 350 |
| Nickel | 98.6 | 2,000 | | | 20 |
| Selenium | ND | 100 | | | 1.0 |
| Silver | ND | 500 | | | 5 |
| Thallium | ND | 700 | | | 7.0 |
| Vanadium | 34.7 | 2,400 | | | 24 |
| Zinc | 2560 | 5,000 | | | 250 |

* This is for Chromium (VI) compounds, for Chromium (III) compounds use 5 & 2,500

ND denotes not detected

## Table 3

### Various Contaminant Concentrations

| Analyte | Culvert Sample | | Regulatory Level |
|---|---|---|---|
| | max conc. | avg conc. | |
| TPH | 108 | ND | NL |
| PCBs[1] | ND | ND | 50[2] mg/kg TTLC<br>5[2] mg/kg STLC |
| See Appendix B for a list of organic compounds analyzed for | | | |

(1) Includes Aroclor 1016, 1221, 1232, 1242, 1248, 1254, 1260, and 1262.

(2) From Table III of 22 CCR §66261.24(a)(2).

ND denotes not detected

NL denotes no listed regulatory level

## Table 2

### Total Metal Concentrations for Culvert Sampling

All concentrations are in mg/kg (PPM)

| Analyte | Culvert Sample #5 (0448-96) | TTLC Regulatory Level | WET Test | | STLC Regulatory Level |
|---|---|---|---|---|---|
| | Max conc. | | Std | D.I. | |
| Antimony | ND | 500 | | | 15 |
| Arsenic | 15.7 | 500 | | | 5.0 |
| Barium | 193 | 10,000 | | | 100 |
| Beryllium | ND | 75 | | | 0.75 |
| Cadmium | 2.0 | 100 | | | 1.0 |
| Chromium (Total) | 63.4 | 500* | ND | ND | 5* |
| Cobalt | 21.6 | 8,000 | | | 80 |
| Copper | 1330 | 2,500 | ND | ND | 25 |
| Lead | 100 | 1,000 | 5.9 | ND | 5.0 |
| Mercury | 0.287 | 20 | | | 0.2 |
| Molybdenum | 87.3 | 3,500 | | | 350 |
| Nickel | 30.8 | 2,000 | | | 20 |
| Selenium | ND | 100 | | | 1.0 |
| Silver | ND | 500 | | | 5 |
| Thallium | ND | 700 | | | 7.0 |
| Vanadium | 37.5 | 2,400 | | | 24 |
| Zinc | 889 | 5,000 | | | 250 |

* This is for Chromium (VI) compounds, for Chromium (III) compounds use 5 & 2,500

ND denotes not detected

## Table 3

### Various Contaminant Concentrations

| Analyte | Culvert Sample | | Regulatory Level |
|---|---|---|---|
| | max conc. | avg conc. | |
| TPH | 127 | ND | NL |
| PCBs[1] | ND | ND | 50[2] mg/kg TTLC<br>5[2] mg/kg STLC |
| See Appendix B for a list of organic compounds analyzed for | | | |

(1) Includes Aroclor 1016, 1221, 1232, 1242, 1248, 1254, 1260, and 1262.

(2) From Table III of 22 CCR §66261.24(a)(2).

ND denotes not detected

NL denotes no listed regulatory level

## Table 2

### Total Metal Concentrations for Culvert Sampling

All concentrations are in mg/kg (PPM)

| Analyte | Culvert Sample # 6 (0449-96) | TTLC Regulatory Level | WET Test NOT DONE | | STLC Regulatory Level |
|---|---|---|---|---|---|
| | Max conc. | | Std | D.I. | |
| Antimony | ND | 500 | | | 15 |
| Arsenic | 55.6 | 500 | | | 5.0 |
| Barium | 729 | 10,000 | | | 100 |
| Beryllium | ND | 75 | | | 0.75 |
| Cadmium | 5.0 | 100 | | | 1.0 |
| Chromium (Total) | 103 | 500* | | | 5* |
| Cobalt | 33.3 | 8,000 | | | 80 |
| Copper | 2550 | 2,500 | | | 25 |
| Lead | 268 | 1,000 | | | 5.0 |
| Mercury | ND | 20 | | | 0.2 |
| Molybdenum | 721 | 3,500 | | | 350 |
| Nickel | 34.0 | 2,000 | | | 20 |
| Selenium | ND | 100 | | | 1.0 |
| Silver | ND | 500 | | | 5 |
| Thallium | ND | 700 | | | 7.0 |
| Vanadium | 26.0 | 2,400 | | | 24 |
| Zinc | 1810 | 5,000 | | | 250 |

* This is for Chromium (VI) compounds, for Chromium (III) compounds use 5 & 2,500.

ND denotes not detected

## Table 3

### Various Contaminant Concentrations

| Analyte | Culvert Sample | | Regulatory Level |
|---|---|---|---|
| | max conc. | avg conc. | |
| TPH | 74 | ND | NL |
| PCBs[1] | ND | ND | 50[2] mg/kg TTLC<br>5[2] mg/kg STLC |
| See Appendix B for a list of organic compounds analyzed for | | | |

[1] Includes Aroclor 1016, 1221, 1232, 1242, 1248, 1254, 1260, and 1262.

[2] From Table III of 22 CCR §66261.24(a)(2).

ND denotes not detected

NL denotes no listed regulatory level

## Table 2

### Total Metal Concentrations for Culvert Sampling

All concentrations are in mg/kg (PPM)

| Analyte | Culvert Sample #7 (0450-96) | TTLC Regulatory Level | WET Test NOT DONE | | STLC Regulatory Level |
|---|---|---|---|---|---|
| | Max conc. | | Std | D.I. | |
| Antimony | ND | 500 | | | 15 |
| Arsenic | 21.8 | 500 | | | 5.0 |
| Barium | 189 | 10,000 | | | 100 |
| Beryllium | ND | 75 | | | 0.75 |
| Cadmium | ND | 100 | | | 1.0 |
| Chromium (Total) | 389 | 500* | | | 5* |
| Cobalt | 13.5 | 8,000 | | | 80 |
| Copper | 4180 | 2,500 | | | 25 |
| Lead | 330 | 1,000 | | | 5.0 |
| Mercury | 2.77 | 20 | | | 0.2 |
| Molybdenum | 171 | 3,500 | | | 350 |
| Nickel | 436 | 2,000 | | | 20 |
| Selenium | ND | 100 | | | 1.0 |
| Silver | ND | 500 | | | 5 |
| Thallium | ND | 700 | | | 7.0 |
| Vanadium | 10.9 | 2,400 | | | 24 |
| Zinc | 914 | 5,000 | | | 250 |

* This is for Chromium (VI) compounds, for Chromium (III) compounds use 5 & 2,500.

ND denotes not detected

## Table 3

### Various Contaminant Concentrations

| Analyte | Culvert Sample | | Regulatory Level |
|---|---|---|---|
| | max conc. | avg conc. | |
| TPH | 398 | ND | NL |
| PCBs[1] | 561* | ND | 50[2] mg/kg TTLC<br>5[2] mg/kg STLC |
| See Appendix B for a list of organic compounds analyzed for | | | |

[1] Includes Aroclor 1016, 1221, 1232, 1242, 1248, 1254, *1260, and 1262.

[2] From Table III of 22 CCR §66261.24(a)(2).

ND denotes not detected

NL denotes no listed regulatory level

**Table 2**

**Total Metal Concentrations for Culvert Sampling**

All concentrations are in mg/kg (PPM)

| Analyte | Culvert Sample #8 (0451-96) | TTLC Regulatory Level | WET Test NOT DONE | | STLC Regulatory Level |
|---|---|---|---|---|---|
| | Max conc. | | Std | D.I. | |
| Antimony | ND | 500 | | | 15 |
| Arsenic | 29.6 | 500 | | | 5.0 |
| Barium | 308 | 10,000 | | | 100 |
| Beryllium | ND | 75 | | | 0.75 |
| Cadmium | 3.3 | 100 | | | 1.0 |
| Chromium (Total) | 93.0 | 500* | | | 5* |
| Cobalt | 42.9 | 8,000 | | | 80 |
| Copper | 10100 | 2,500 | | | 25 |
| Lead | 89.8 | 1,000 | | | 5.0 |
| Mercury | 0.260 | 20 | | | 0.2 |
| Molybdenum | 155 | 3,500 | | | 350 |
| Nickel | 6870 | 2,000 | | | 20 |
| Selenium | ND | 100 | | | 1.0 |
| Silver | ND | 500 | | | 5 |
| Thallium | ND | 700 | | | 7.0 |
| Vanadium | 34.6 | 2,400 | | | 24 |
| Zinc | 1520 | 5,000 | | | 250 |

* This is for Chromium (VI) compounds, for Chromium (III) compounds use 5 & 2,500.

ND denotes not detected

**Table 3**

**Various Contaminant Concentrations**

| Analyte | Culvert Sample | | Regulatory Level |
|---|---|---|---|
| | max conc. | avg conc. | |
| TPH | 76 | ND | NL |
| PCBs[1] | 192 | ND | 50[2] mg/kg TTLC<br>5[2] mg/kg STLC |
| See Appendix B for a list of organic compounds analyzed for | | | |

[1] Includes Aroclor 1016, 1221, 1232, 1242, 1248, 1254, 1260, and 1262.

[2] From Table III of 22 CCR §66261.24(a)(2).

ND denotes not detected

NL denotes no listed regulatory level

## 2.4.3 PREVIOUS SAMPLING EFFORTS

Table 4 compares previous sampling efforts associated with work conducted at Dry Dock 4 at HPA. Data from the ESAP (reference 1) for Station S-17 at the dry dock entrance is shown. Sample 1 was taken from the mud surface and sample 2 was taken 2½ feet below the mud surface. Data from the summary report on contamination in the San Francisco Bay prepared by NOAA (reference 12) is also shown in Table 4. A comparison of the conditions at HPA to the rest of the bay in general is provided. Lastly data from the PRC HHRA (reference 18) sampling is also shown in Table 4. This soil sampling was conducted in areas north and south of Dry Dock 4.

These data are provided for background information only and are not intended to be used for any removal actions discussed in this RPA.

Copper concentrations found in the sump sediments during culvert isolation were about 9 times higher than the surrounding bay sediments and are about 4 times higher than the surrounding soil samples. Zinc concentrations in the sump sediments were about 3 times higher than the surrounding bay sediments and the surrounding soil samples. This indicates that the copper and zinc concentrations are most likely a result of the industrial activities which have taken place in the dry dock and were probably leaching from the sediments in the culverts since similar trends are noted in the culvert samples.

## 2.4.4 DATA QUALITY

The sampling results appear to be reasonable considering the activities which have taken place in Dry Dock 4. The metals with elevated levels were common additives in materials which were used for ship repair. All the samples from the de-watering culverts produced very similar results. Method blanks were also analyzed for each test that was accomplished. The complete sampling results are included in this RPA as Appendix B

**Table 4**

**Comparison of Culvert Isolation Sampling and**

**Other Sampling Efforts in the Dry Dock 4 Area**

All concentrations are in mg/kg (PPM)

| Analyte | Culvert Isolation | | ESAP Station S-17 | | NOAA Summary | | HHRA |
|---|---|---|---|---|---|---|---|
| | 1249-95 | 1250-95 | Sample 1 | Sample 2 | HPA Area | S.F. Bay | |
| Antimony | ND | ND | ND | ND | NA | NA | 3.36 |
| Arsenic | 2.7 | 7.5 | 5.6 | 4.2 | NA | NA | 3.74 |
| Barium | 20.1 | 43.0 | NA | NA | NA | NA | 173 |
| Beryllium | ND | ND | NA | NA | NA | NA | 0.19 |
| Cadmium | ND | 3.2 | ND | ND | 0.96 | 1.06 | 0.36 |
| Chromium (Total) | 5.6 | 27.1 | 79.6 | 83.4 | NA | 89 | 93.6 |
| Cobalt | ND | 5.4 | NA | NA | NA | NA | 26.4 |
| Copper | 476 | 411 | 46 | 49.6 | 61 | 51 | 111 |
| Lead | 28.1 | 22.8 | 22.8 | 27.8 | 45 | 56 | 22.6 |
| Mercury | 0.19 | 0.77 | 0.36 | 0.26 | 0.53 | 0.45 | 0.15 |
| Molybdenum | ND | 23.5 | NA | NA | NA | NA | 14.9 |
| Nickel | 9.7 | 73.1 | 83.7 | 82.5 | NA | NA | 76.8 |
| Selenium | ND | ND | ND | ND | NA | NA | NA |
| Silver | ND | ND | ND | ND | 1.58 | 1.13 | NA |
| Thallium | ND | ND | ND | ND | NA | NA | NA |
| Vanadium | 1.6 | 10.0 | NA | NA | NA | NA | 81.6 |
| Zinc | 298 | 382 | 118 | 129 | NA | NA | 109 |

## 2.5 STREAMLINED RISK EVALUATION

This risk evaluation will focus on the effects of contamination to the nearby sensitive ecosystem receptors and to the food chain. This risk evaluation assumes that the only water to contact the sediments is San Francisco Bay waters.

### 2.5.1 PREVIOUS RISK ASSESSMENTS AND EVALUATIONS

A human health risk assessment was conducted for Dry Dock 4 workers by PRC (reference 18). The report evaluated the impact of contaminants identified in the Site Inspection to the health of industrial workers. The HHRA concluded that no potential adverse health affects to industrial workers caused by releases from the soil within and adjacent to Dry Dock 4 is expected in the absence of any actions to control or mitigate these releases at this time. The assessment is based on the assumption that a majority of the site is covered by asphalt and concrete and potential receptors are restricted from using groundwater, removing soils or pavement, fishing, and swimming. Human risk will not be further evaluated in this RPA.

### 2.5.2 EXPOSURE PATHWAYS

Aquatic receptors may be subjected to dermal contact and ingestion of metals leaching into waters entering the dry dock during docking evolutions or during periods of time when the caisson is not in place. Contaminated water from the dock subsequently would be released to San Francisco Bay during pump down of the dock. Fish which are exposed to the contaminated waters may bioaccumilate the metals and in turn expose piscivorous birds and to a lesser extent humans who might consume fish taken from this area.

No nuclear work was done in the dry dock so it is not expected that any of the existing sediments will have any radioactive waste mixed with them. A small radioactive source previously found in the dry dock came from a radium dial from an old naval vessel and appears to be an isolated case. All the sediments taken from the sump area during culvert isolation and more recently during culvert sampling were checked for radioactivity and none was found.

### 2.5.4 RISK EVALUATION

Table 2 lists the results of the total metals analysis that was recently performed and compares the results to the TTLC and the STLC values of Title 22. The sediments in the culverts may be in direct contact with the water of San Francisco Bay during docking evolutions. This comparison indicates that copper, lead, and nickel concentrations in the culvert sediments exceed the Title 22 regulatory values and may be detrimental to the marine environment.

Removal or permanent sealing of the culvert sediments will prevent the potential exposure of marine animals and the food chain. This removal action will protect the sensitive ecosystems of the San Francisco Bay from the culvert sediments.

# 3.0 IDENTIFICATION OF REMOVAL ACTION SCOPE, GOALS AND OBJECTIVES

## 3.1 STATUTORY FRAMEWORK

This removal action is taken pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the NCP. Authority is delegated by the Office of the President of the United States by Executive Order 12080 and 12580. These orders provide the US Department of the Navy (DON) with the authorization to conduct and finance removal actions. This removal action is time-critical since it was determined that a six month planning period does not exist from the time a removal action was determined to be necessary before the initiation of removal actions is required. The requirement for this RPA and a mandated public comment period provide opportunity for public input to the cleanup process.

The DON is the lead agency for the US Government for this removal action. As such, the DON has final approval authority over the recommended alternative and all public participation activities. This RPA complies with the requirements of CERCLA, SARA, and NCP at 40 CFR §300. Conditions at HPA Dry Dock 4 meet the following National Oil and Hazardous Substances Pollution Contingency Plan (NCP) requirements for a removal action (40 CFR §300.415 (b) (2)):

- (i) - Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants.

- (ii) - Actual or potential contamination of drinking water supplies or sensitive ecosystems.

## 3.2 DETERMINATION OF REMOVAL SCOPE

This scope of this RPA is to address the final removal action for the sediments in the drainage culvert network of Dry Dock 4. In addition this removal action shall, to the extent practicable, contribute to the efficient performance of any long-term remedial action for this site.

The goal of this removal action is to prevent the potential exposure of marine animals and the food chain from contaminants in the drainage culverts.

Specific objectives are:

- To initiate removal of contaminated ABM from the drainage culvert system of Dry Dock 4 at HPA.
- This removal action will take steps to preclude affecting the water quality of San Francisco Bay during accomplishment.
- To dispose of waste ABM from the drainage culverts by land filling.

## 3.3 DETERMINATION OF REMOVAL SCHEDULE

The removal action actual site work may take up to six months. This is the actual excavation and site restoration time required if the absolute worst case is assumed. This estimate assumes that 50 cubic yards of material can be removed per day. The removal action will have to be coordinated with the ship work to be accomplished in the dock. The removal action and site restoration activities are expected to be completed within approximately six months after the award of the removal contract.

## 3.4 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

The evaluation of ARARs for this RPA may be found in Appendix A. The following sections provide an overview of the ARAR process and a summary of those ARARs that potentially affect the development of removal action alternatives.

### 3.4.1 ARAR OVERVIEW

Section 121(d) of CERCLA states that remedial actions for CERCLA sites must attain (or the decision document must justify the waiver of) any Federal or more stringent State environmental standards, requirements, criteria, or limitations that are determined to be legally applicable or relevant and appropriate (ARAR). The US Environmental Protection Agency (EPA) has promulgated a requirement in the NCP mandating that CERCLA removal actions "...shall, to the extent practicable considering the exigencies of the situation, attain applicable or relevant and appropriate requirements under federal environmental or state environmental or facility siting laws" NCP (40 CFR §300.415(l)).

Applicable requirements are substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law that specifically address the situation at a CERCLA site. If the jurisdictional prerequisites of the standard show a direct correspondence when objectively compared with the conditions at the site, the requirement is applicable. If the requirement is not legally applicable, it is then evaluated to determine whether it is relevant and appropriate.

Relevant and appropriate requirements are substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law that, although not applicable, address problems or situations sufficiently similar to the circumstances of the proposed response action and are well suited to the conditions of the site. In evaluating relevance and appropriateness the requirement

shall be examined, where pertinent, to determine whether it addresses problems or situations sufficiently similar to the circumstances, and whether it is well suited to the site, and therefore is both relevant and appropriate. The following comparisons shall be made, where pertinent, to determine relevance and appropriateness:

- The purpose of the requirement and the purpose of the CERCLA action.
- The medium regulated or affected by the requirement and the medium contaminated or affected at the CERCLA site.
- The substances regulated by the requirement and the substances found at the CERCLA site.
- The actions or activities regulated by the requirement and the remedial action contemplated at the CERCLA site.
- Any variances, waivers, or exemptions of the requirement and their availability for the circumstances at the CERCLA site.
- The type of place regulated and the type of place affected by the release or CERCLA action.
- The type and size of structure or facility regulated and the type and size of structure or facility affected by the release or contemplated by the CERCLA action.
- Any consideration of use or potential use of affected resources in the requirement and the use or potential use of the affected resource at the CERCLA site.

Only those state standards that are promulgated, are identified by the state in a timely manner, and are more stringent than federal requirements may be ARARs.

The Department of the Navy (DON), as the lead federal agency, has responsibility for the identification of Federal ARARs at HPA. The Navy/Marine Corps IR manual (reference 14), Section 5.4.2.1 states "Remedial actions conducted entirely on-site need only comply with the substantive aspects of ARARs and not the administrative aspects, such as permitting (specifically exempted under CERCLA, Section 121(e)) or administrative reviews. Remedial actions which are not conducted entirely on-site must comply with substantive and administrative aspects, including permitting. Since entire Navy/Marine Corps installations are listed as sites on the National Priorities List (NPL), remedial actions which are conducted within an installation's property lines should be considered 'on-site', and thus need only comply with substantive requirements of ARARs. Administrative procedures are not considered

ARARs but should be considered when planning and implementing remedial actions."

Where ARARs do not exist, the NCP states that agency advisories, criteria, or guidance are to be considered (TBC). Provisions in the TBC category are not ARARs because they are generally neither promulgated nor enforceable and are not required as cleanup standards.

The ARARs that are listed in this document are potential ARARs. The final determination of which ARARs will be used shall be listed in the Action Memorandum for this removal action..

## 3.4.2 ARARS SUMMARY

Even though Alternative #1 seals the culverts with the sediment in place, it will be necessary to remove minor amounts of sediment to install form work or to provide clean surfaces on which the grout may adhere. The installation of reinforcing bar into the existing concrete will require the removal of small quantities of existing concrete. All of the requirements which address generating waste will apply to both alternatives.

Requirements of ARARs and TBCs are generally placed into three categories: chemical-specific, action-specific, and location-specific requirements. Chemical-specific and location-specific ARARs affecting the development of removal action alternatives are discussed in the following sections. Both alternatives produce some amount of sediment and water that will require disposal. For this reason both alternatives have some common action specific ARARs. The common ARARs will be discussed in this section. Action specific ARARs that are unique to one alternative will be discussed in the effectiveness portion of the alternative analysis.

### 3.4.2.1 CHEMICAL SPECIFIC ARARS

Chemical specific ARARs are generally health or risk based numerical values or methodologies applied to site specific conditions to establish numerical values. Chemical specific ARARs set limits on concentrations of specific hazardous substances, pollutants, and contaminants in the environment where removal actions are conducted. These ARARs are applied to the chemicals of concern in the designated media.
The are no chemical specific ARARs for this action because the sediment will be removed in its entirety or will be in sealed in place.
The requirement to perform a hazardous waste determination is an action -specific ARAR.
Some action specific ARARs include numerical values or methodologies to establish numerical values such that they fit into both categories. Action specific ARARs with numerical values will be discussed in this section.

The existing NPDES permit for operating the dry dock (reference 7) specifies soluble metal concentrations that may be discharged into the bay. The final rinse water from Alternative #2 shall attempt to obtain this criteria.

All solid and liquid wastes generated during this removal action will be collected and disposed of off site. No discharges to surface waters or ground waters are planned or anticipated. The City and County of San Francisco Discharge Requirements for Waste Water will be a requirement for any discharge of process water to the city sewer system.

### 3.4.2.2 LOCATION SPECIFIC ARARS

Location specific ARARs are requirements that are invoked solely due to the location of the site and would not otherwise be invoked.

Dry Dock 4 has been determined to be eligible for inclusion on the National Register of Historic Places (NRHP) and all work must be coordinated through the HBR to allow comments. Appendix A lists the appropriate sections of the National Historic Preservation Act and the Historic Sites, Buildings, and Antiquities Act that are applicable.

### 3.4.2.3 ACTION SPECIFIC ARARS

Action specific ARARs are technology or activity based requirements or limitations on actions involving the management of hazardous waste. Since it is expected the material excavated will be characterized as non hazardous waste these ARARs may not apply. Action specific ARARs which are common to both alternatives include requirements related to treatment, and disposal of potentially hazardous waste including soil and water generated incidental to the removal actions. The following is a brief list of the ARARs that will be invoked if the sediment is characterized as a hazardous waste.

⇒ Treatment/Placement Of Waste In Land Disposal Units - 22 CCR §66268.40 and §66268.42
⇒ Waste Piles - 22 CCR §66264.111, §66264.251, and §66264.258
⇒ On-site Waste Generation - 22 CCR §66262.10 and §66262.11
⇒ Hazard Waste Accumulation - 22 CCR §66262.34

# 4.0 IDENTIFICATION AND ANALYSIS OF REMOVAL ACTION ALTERNATIVES

The following sections provide identification and analysis of the removal action alternatives. Explanations are provided as to why the alternatives were chosen for consideration.

## 4.1 IDENTIFICATION OF REMOVAL ACTION ALTERNATIVES

Based on the objective presented in section 3.5, two alternatives have been developed for the removal action at HPA Dry Dock 4. These alternatives are described and analyzed in the following section. These alternatives are considered to cover the range of the most qualified technologies applicable to achieving the goal and objectives of the removal action for the given contaminants and conditions existing at the site.

CERCLA preference for treatment over conventional containment or land disposal is not practicable in this case because:

- In-situ treatment/chemical fixation of any kind would be difficult due to the lack of accessibility of a large portion of the material.
- On site ex-situ treatment would probably only be advantages if the material is characterized as a hazardous waste. Even then the cost of mobilization for the treatment of a relatively small quantity of material may overcome the disposal costs. After treatment the material would still need to be transported and disposed of.

For the reasons mentioned above only the following two alternatives were analyzed for this removal action:

Alternative 1 - Remove minimal amounts of sediment and permanently seal the culverts. The sediments in the culverts would be encapsulated in concrete. Dispose of the removed sediment in an appropriate landfill.

Alternative 2 - Remove the sediments from the culverts and return the culverts back to their original condition. Dispose of the removed sediment in an appropriate landfill.

## 4.2 ANALYSIS OF REMOVAL ACTION ALTERNATIVES

The alternatives are evaluated based on effectiveness, implementability, and cost. To evaluate effectiveness, consideration was given to the overall protection of public health and the environment, compliance with ARARs, and both its long and short term effectiveness. Evaluation of the implementability of each alternative includes technical feasibility, commercial availability, administrative feasibility, and state and public acceptance.

The cost evaluation is based upon estimates for design, equipment rental, labor, analytical cost, transportation, mobilization, and disposal fees (tippage). The engineering portions of the job were estimated by MINS using a current labor rate of $55.00 per hour. The production portions of the job were estimated by Navy Public Works Center Oakland (PWC). The alternatives duration's are believed to be short enough that a present worth analysis was not performed.

## 4.2.1 ALTERNATIVE #1 SEALING THE DRAINAGE CULVERTS

### 4.2.1.1 DESCRIPTION

This alternative will seal the sediments in the culverts to prevent potential exposure to San Francisco Bay. The gutters and drains to the culverts will also be sealed with concrete. The following is a description of the work required:

⇒ Minimal amounts of sediment will be removed from the culverts near the sumps. This will provide the necessary length of clean culvert for sealing. The culvert surface shall be cleaned in order to achieve good adherence of the new concrete.

⇒ Reinforcing bars shall be installed near the sump end of the culverts. Holes shall be drilled into the existing walls of the culverts and the reinforcing bars shall be grouted in place. This will provide the necessary strength to hold the sealing concrete in place.

⇒ Forms shall be constructed at the sump end of the culverts. The form work will be installed in a manner so that the finished surface of the sealing concrete will be flush with the existing wall of the sump.

⇒ Concrete shall be pumped into the culverts through the gutter drains. This operation will move from drain to drain until the culvert is completely full. All void space in the culvert network shall be filled with concrete. The drains leading into the culverts shall also be filled.

⇒ All sediments shall be removed from the drainage gutters and the gutters shall be water blasted to clean their surfaces. Reinforcing bars shall be installed in the gutters by drilling into the sides and grouting it in place.

⇒ Finally the drainage gutters will be filled with concrete to a level even with the dry dock floor.

⇒ Approximately 300 cubic yards of concrete will be required to fill the culverts and drainage gutters

### 4.2.1.2 EFFECTIVENESS

Sealing the sediments in the drainage culvert network with a concrete cap should be an effective method of preventing this material from reaching the bay waters. As long as the concrete seal is in place and has not deteriorated it should protect the public health and the environment from the contaminated sediments. If for any reason the seal should be compromised the sediments will be exposed to the environment. The short term effectiveness of this alternative is considered to be good. The long term effectiveness should be considered marginal because of the

inability to predict the longevity of the cold bond seal between the new and old concrete. Dry dock deterioration may also cause a release of the contained contaminants over a period of time.

Whether or not this alternative can comply with all of the ARARs is questionable. This alternative will change the appearance and operation of the dry dock forever. A determination will be required whether these modifications can or should be made with respect to the National Historic Preservation Act.

The dewatering time of the dry dock will not be significantly impacted, however additional dry dock clean up time is expected. Wash down of the dry dock will require more time since all sediment will need to be moved to the caisson end of the dock before it can enter the sumps. This increase in time is not expected to be very significant.

There will also be no surface drainage to control rain water and other water on the dock floor. This lack of drainage may lead to health and safety problems related with standing or stagnant water in the dock.

This alternative may be adding to future requirements for the operation of the dry dock.

This alternative does reduce the mobility of the contamination but does not reduce the toxicity or the volume of the contamination.

The short term effectiveness of this alternative is rated good because of its ease of implementation and the reduction of mobility of contaminants. The long term effectiveness is marginal because of unknown factors related to the assured reduction of mobility of the contaminants.

#### 4.2.1.3 IMPLEMENTABILITY

Administrative feasibility, and state and public acceptance are the largest problems facing this alternative. This alternative may require a considerable length of time for review and resolution of regulatory agency concerns. This alternative has not previously been recommended by the Navy nor considered for acceptance by the California RWQCB, the State Historic Preservation Officer, or the Advisory Council on Historic Preservation. Dry Dock 4 has been determined to be eligible for inclusion on the National Register of Historic Places.

This alternative uses currently available construction methods and equipment. No special technologies or unproved equipment will be required and therefore this option is technically feasible. The only difficulty that may arise is ensuring that the culverts are completely filled. This problem will need to be worked out on site by varying the concrete mix and the pressures used for placement. All of the

equipment for this alternative is commercially available with short notice. The implementation of this alternative should take just three to four weeks to complete following the engineering phase of the work.

#### 4.2.1.4 COST

The costs for this alternative are shown in Table 6 with a cost break down. The engineering portions of the job were estimated by MINS using a current labor rate of $55.00 per hour. These estimates assume that all documentation will be prepared in accordance with US EPA guidance documents. The production portions of the job were estimated by PWC. Reference 16 provides a detail break down of the production estimate and is attached as appendix B.

The future cost impacts of additional wash down time and inspection of the sealing concrete is estimated to be approximately equal to the future cost of culvert maintenance inspection and cleaning for Alternative 2. For this reason separate line items for these costs is not shown. It is questionable whether the Navy or the lease holder would be responsible for these costs. The future costs of lost productivity due to standing water is not estimated since it is dependent on weather patterns and ship schedules. It is only mentioned as a possible disadvantage of this alternative.

A separate operation and maintenance (O&M) program is not required for this alternative. Current structural integrity inspections for the dry dock will verify the structural integrity of the sealed culverts. A monitoring program to verify the integrity of the culvert seal should ,however, be initiated

The total estimated cost for this alternative is $328,125.

**Table 6**

**Cost for Removing Necessary Sediments and Sealing the Drainage Culvert Network**

| Description | Cost Break Down | Total Cost |
|---|---|---|
| **Administrative Documents** | | $65,340 |
| Preliminary Work | $880 | |
| Design (Culvert mods & equip arrangement) | $15,400 | |
| Procurement Support | $3,520 | |
| Action Memo/ Work Plan with SAP and HSP | $33,880 | |
| Notice of No Adverse Effect | $1,320 | |
| Public Notice | $1,320 | |
| Completion Report | $7,700 | |
| Transfer of Information | $220 | |
| Monthly Status | $1,100 | |
| **Production Support** | | $13,640 |
| Field Oversight | $4,125 | |
| Meetings and Site Visits | $9,515 | |
| **Production** | | $249,205 |
| Labor | $170,141 | |
| Material and Equipment | $79,064 | |
| **Total** | | **$328,185** |

## 4.2.2 ALTERNATIVE #2 REMOVAL OF THE SEDIMENTS FROM THE DRAINAGE CULVERTS

### 4.2.2.1 DESCRIPTION

This alternative will remove all of the sediments in the drainage culverts to prevent potential exposure to San Francisco Bay. Once removed the sediments will be transported off site and disposed. TCLP and STLC concentrations of the ABM in the culverts will allow land fill deposition. The Roosevelt Regional Landfill in the state of Washington has been contacted and will take the sediments for about $45.00 per ton. The following is a description of the work required:

Sediments shall be removed from the drainage gutters using methods described for the culverts below.

Due to limited access for personnel to enter the drainage culverts, no confined space entry will be attempted for this removal

The method chosen for cleaning the culverts by Public Works Center(PWC), Oakland is use of high pressure water jets to loosen and move the ABM and vacuum trucks to remove the material from the culverts and personnel access to the culverts will not be required.
The removed material will be out of the culverts and stockpiled until disposal. All of the sediments will be sampled for characterization, transported off site, and disposed.

The final cleaning of culverts and drainage gutters will be accomplished using a power washer with clear water. All waste water from the cleaning process will be contained and collected. The water collected will be reused when practicable. No process water shall be discharged to surface or ground waters. Rinse water will be sampled to verify the cleanliness of the culverts.

After the culvert cleaning is complete the three de-watering sumps will also be cleaned.

#### 4.2.2.2 EFFECTIVENESS

Removing the sediments and cleaning the drainage culvert network will ensure that the existing sediments will never reach the bay waters. This alternative will provide protection of the public health and the environment. This alternative coupled with proper industrial practices and future maintenance of the culvert network, will provide excellent short term and long term effectiveness.

The time estimated to complete the actual ABM removal and disposal is six months or less.
The industrial processes that lead to the current situation, namely abrasive blasting, have since been modified. More restrictions exist on these practices to control the waste which is generated. The culvert network should be cleaned periodically in the future to prevent the buildup of sediments in the culverts.

This alternative does comply with all ARARs and has minimal effect on the appearance of the dry dock. The State Historic Preservation Officer has already concurred to the determination that the installation of manholes will have no adverse effect on Dry Dock 4 (reference 4).

This alternative is not a treatment alternative therefore the toxicity, mobility, or volume of the spent ABM has not been changed by removal and land filling. This action does however eliminate the toxicity, mobility, and volume of the contaminated material at this site.

#### 4.2.2.3 IMPLEMENTABILITY

The Navy has proposed to fund the removal of the sediments from the culverts as being the solution for the current problem. The California RWQCB has agreed with the Navy proposal to remove the sediments in the sumps and culverts (reference 6). As stated above, the State Historic Preservation Officer has already concurred to the determination that this alternative will have no adverse effect on Dry Dock 4 (reference 4). For these reasons this alternative is considered administratively feasible. Some State acceptance of this alternative has already been expressed.

Community acceptance of this alternative is expected to be good because of the elimination of the threat of contamination to the Bay waters.

This alternative uses currently available construction methods and equipment. No special technologies or unproved equipment will be required and therefore this option is technically feasible. All of the equipment for this alternative are commercially available with short notice.

#### 4.2.2.4 COST

The costs for this alternative are shown in Table 7. The engineering portions of the job were estimated by MINS using a current labor rate of $55.00 per hour and is estimated to be $60,115. These estimates assume that all documentation will be prepared in accordance with US EPA guidance documents. The production portions of the job were estimated by PWC to be $589,105. Appendix B provides a detailed break down of the production estimate. No present worth projection has been included for this alternative because completion is expected in less than 12 months.

The future O&M cost impacts of this alternative include periodic inspection and cleaning of the culverts. This is estimated to be approximately equal to the future cost of additional wash down time and inspection of the sealing concrete associated with Alternative 1. It is questionable whether the Navy or the lease holder would be responsible for these costs but they are considered to be routine maintenance items for dry dock operations.

For this reason separate line items for these costs are not shown.

**Table 7**

**Cost for Removing All Sediments From the Drainage Culvert Network**

| Description | Cost Break Down | Total Cost |
|---|---|---|
| **Administrative Documents** | | $50,600 |
| Preliminary Work | $880 | |
| Design | $6,600 | |
| Procurement Support | $2,640 | |
| Action Memo/ Work Plan with SAP and HSP | $29,480 | |
| Notice of No Adverse Effect | $660 | |
| Public Notice | $1,320 | |
| Completion Report | $7,700 | |
| Transfer of Information | $220 | |
| Monthly Status | $1,100 | |
| **Production Support** | | $9,515 |
| Field Oversight | $2,750 | |
| Meetings and Site Visits | $6,765 | |
| **Production** | | $589,105 |
| Labor | $99480 | |
| Material and Equipment | $489625 | |
| **Total** | | **$649,220** |

# 5.0 COMPARATIVE ANALYSIS OF REMOVAL ACTION ALTERNATIVES

This section presents a comparative analysis of the two alternatives proposed. Alternative #1 involves removal of minor amounts of sediments and permanently sealing the drainage culverts. Alternative #2 involves removing all of the sediments from the drainage culverts. A fair, good, or excellent rating is used to assess each alternative with respect to different evaluation criteria. The evaluation criteria are derived from the criteria that were mentioned during the presentation of the alternatives. These ratings are presented in a table format for ease of comparison.

**Table 8**

**Comparative Analysis**

| Evaluation Criteria | Significant Differences | Evaluation Rating | |
|---|---|---|---|
| | | **Alternative #1 Culvert Sealing** | **Alternative #2 Sediment Removal** |
| Protection of the Community | Alternative #2 will possibly expose the community during removal. This should be limited due to restricted access at the site .Alternative #1, because the sediments remain in place, could be a future threat.. | Fair | Good |
| Protection of Workers | Both alternatives can be accomplished using commercially available equipment and require no confined space entry.. | Good | Good |
| Protection of Environment | Alternative #2 has no chance of future exposure of San Francisco Bay because these sediments will be relocated to an environment which they do not threaten. Alternative #1, because the sediments remain in place, could be a future threat.. | Fair | Excellent |
| Compliance with ARARs | Alternative #1 may not be able to comply with ARARs with respect to the National Historic Pres. Act | Fair | Excellent |
| Meets removal | Both Alternatives meet the level of | Fair | Excellent |

| Evaluation Criteria | Significant Differences | Evaluation Rating | |
|---|---|---|---|
| | | Alternative #1 Culvert Sealing | Alternative #2 Sediment Removal |
| objectives | containment expected and both maintain control until a long term solution can be implemented. Alternative #1 however does have a residual effects concern because of remaining contamination. | | |
| Technical feasibility | Both alternatives use proven, and relatively low tech means that can be adapted to the site conditions. | Excellent | Excellent |
| Short Term Effectiveness | Both Alternatives can be easily and safely implemented | Excellent | Excellent |
| Long Term Effectiveness | Alternative #1 may deteriorate with time. | Fair | Excellent |
| Timeliness | Both alternatives can be implemented in less than 1 year and both contribute to remedial performance | Good | Good |
| Commercial Availability | Both options use readily available equipment, personnel, and services<br>.(a) Both require off-site disposal<br>(b) PRSC not required for either | Excellent | Excellent |
| Administrative feasibility | The entire action will be accomplished within the boundaries of HPA for both alternatives so easement req'ts, adjoining property impacts and inst. controls will not pose a problem<br>(a) Alt 1 may require permits to fill culverts<br>(b) Alt 2 may require permits to transport sediments to land fill.<br>Exemption from statutory limits not anticipated for either alternative. | Excellent | Excellent |
| Cost | Costs for both Alternatives are reasonable and within the means of the Navy.<br>PRSC Not required<br>Present worth costs Not required | Excellent | Good |

# 6.0 RECOMMENDED REMOVAL ACTION ALTERNATIVE

This RPA was performed in accordance with the current EPA and US Navy guidance documents for a time-critical removal action under CERCLA. The purpose of this RPA was to identify and analyze alternative removal actions to address the potentially contaminated sediments at HPA Dry Dock 4. Two alternatives were identified and evaluated. The alternatives considered were as follows:

⇒ Alternative 1 - Remove minimal amounts of sediment and permanently seal the culverts. The sediments in the culverts would be encapsulated in concrete. Dispose of the removed sediment in an appropriate landfill.

⇒ Alternative 2 - Remove the sediments from the culverts and return the culverts back to their original condition. Dispose of the removed sediment in an appropriate landfill.

Based on comparative analysis of the removal action alternatives completed in Section 5.0, the recommended removal action is Alternative #2. This alternative also adds manholes to the culvert network which will make future inspection or cleaning easier. All of the material removed will be transported via trucks off site for disposal.

Major considerations in this recommendation have been the effectiveness of the alternative and the fact that this course of action was already publicized and accepted. Alternative #1 may run into some problems with implementation. It would require State and public acceptance and a favorable finding from the historical agencies involved. Alternative #2 has very excellent short and long term effectiveness.

# REFERENCES


1. Aqua Terra Technology, March 14, 1991, "Environmental Sampling Analysis Plan for Naval Station Treasure Island, Hunters Point Annex, San Francisco, CA" also, January 29, 1992, "Addendum to Environmental Sampling Analysis Plan for Naval Station Treasure Island, Hunters Point Annex, San Francisco, CA"

2. California Code of Regulations, Title 22, Section 66261.24 (22 CCR §66261.24)

3. California Environmental Protection Agency, California Regional Water Quality Control Board San Francisco Bay Region, December 1992, "Interim Sediment Screening Criteria and Testing Requirements for Wetland Creation and Upland Beneficial Reuse"

4. California Office of Historic Preservation, April 11, 1995, Letter USN 940112A, "Installation of Manholes Along Drainage Culverts, Dry Dock 4, Hunters Point Naval Shipyard, San Francisco, San Francisco County"

5. California Regional Water Quality Control Board, Central Valley Region, May 1993, "A Compilation of Water Quality Goals"

6. California Regional Water Quality Control Board, San Francisco Bay Region, November 3, 1994, Letter File No. 2169.2026, "Dry Dock 4, Hunters Point Annex"

7. California Regional Water Quality Control Board, San Francisco Bay Region, Order No. 92-134, NPDES No. CA0028282, Dry Dock operating permit

8. California State Water Resource Control Board, 11 April 1991, "Water Quality Control Plan for Enclosed Bays and Estuaries of California", Document 91-12 WQ

9. Calscience Environmental Laboratories, Inc., February 13, 1995, Analytical Sampling Data, Contract No. N00123-92-D-4011, Work Order No. 95-02-024

10. Mare Island Naval Shipyard, BRAC Environmental Technical Division, September 8, 1994, "Hunters Point Annex, Dry Dock 4, Environmental Baseline Survey"

11. Mare Island Naval Shipyard, BRAC Environmental Technical Division, January 11, 1995, "Work Instruction for Hunters Point Dry Dock 4 Sump Cleaning and Drainage Tunnel Isolation"

12. National Oceanic and Atmospheric Administration, May 1988, "Status and Trends in Concentrations of Contaminants and Measures of Biological Stress in San Francisco Bay", NOAA Technical Memorandum NOS OMA 41

13. National Oceanic and Atmospheric Administration, 1990, "Potential for Biological Effects of Sediment-Sorbed Contaminants Tested in the National Status and Trends Program", NOAA Technical Memorandum NOS OMA 52

14. Navy/Marine Corps Installation Restoration Manual, February 1992

15. Naval Facilities Engineering Command, Engineering Field Activity, West, October 19, 1994, Letter Ser 09ECI/L5013

16. Navy Public Works Center, Oakland, June 16, 1995, Estimate for Dry Dock 4 Tunnel Sealing

17. Navy Public Works Center, Oakland, May 30, 1995, Estimate for Dry Dock 4 Tunnel Cleaning, Request No. 034-500021

18. PRC Environmental Management, Inc., July 14, 1994, "Parcel B Site Inspection Report, Human Health Risk Assessment, Dry Dock 4, Hunters Point Annex", Contract No. N62474-88-D-5086

19. United States Environmental Protection Agency, "National Ambient Water Quality Criteria, Salt Water Aquatic Life Protection"

20. Guidance on Conducting Time-Critical Removal Actions Under CERCLA.

21 Work Instructions for Hunters Point Dry Dock 4 Drainage Tunnel Sampling, 7 Dec 1995

# APPENDIX A

**Table A - 1**
**Potential State Location-Specific ARARs**

| Location | Requirement | Prerequisites | Citation | ARAR Determination | Comments |
|---|---|---|---|---|---|
| | None | | | | |

## Table A - 2
## Potential Federal Action-Specific ARARs

***Alternatives*: 1. Seal culverts; 2. Sediment removal and off-site disposal.**

| Action | Requirement | Prerequisites | Citation | ARAR Determination | | | Comments |
|---|---|---|---|---|---|---|---|
| | | | | A | RA | TBC | |
| On-site waste generation | Person who generates waste shall determine if that waste is a hazardous waste. | Generator of hazardous waste in California | 22CCR 66262.10, 66262.11 | 1,2, | | | Applicable for any operation where waste is generated. Determination of hazardous waste status should be documented. |
| Hazardous waste accumulation | Generator may accumulate waste on-site for 90 days or less or must comply with requirements for operation a storage facility. | Accumulate hazardous waste. | 22CCR 66262.34 | 1,2, | | | Accumulation of hazardous wastes on-site for longer than 90 days would be subject to RCRA requirements for storage facilities. |
| Container storage | Containers of RCRA hazardous waste must be:<br>-Maintained in good condition<br>-Compatible with hazardous waste to be stored.<br>- Closed during storage except to add or remove waste. | Storage of RCRA haz waste not meeting small quantity generator criteria held for a temporary period greater than 90 days. | 22CCR 66264.171,172, 173 | 1,2 | | | |
| | Inspect container storage areas weekly for deterioration. | | 22CCR 66264. 174 | 1,2 | | | |
| | Place containers on a sloped crack free base and protect with accumulated liquid. Provide containment system with capacity of 10 percent of the volume of containers of free liquids. Remove spilled or leaked waste in a timely manner. | | 22CCR 66264.175(a), (b) | 1,2 | | | |
| | At closure, remove all hazardous waste and residues from containment system. | | 22CCR 66264.178 | 1,2 | | | |

## Table A - 2
## Potential Federal Action-Specific ARARs

***Alternatives*: 1. Seal culverts; 2. Sediment removal and off-site disposal.**

| Action | Requirement | Prerequisites | Citation | ARAR Determination | | | Comments |
|---|---|---|---|---|---|---|---|
| | | | | A | RA | TBC | |
| Excavation | Movement of excavated materials to new location and placement in or on land will trigger land disposal restrictions for the excavated waste. | Materials containing RCRA hazardous wastes subject to land disposal restrictions. | 22CCR 66268.40 | 1,2, | | | |
| | Area from which materials are excavated may require cleanup to levels established by closure requirements. | RCRA hazardous waste placed at site after the effective date of the requirements. | 22CCR 66264.228 (a) (b), (e)-(k), (m), (o)-(q); 258 (a) & (b) | 1,2, | | | |
| Waste Pile | Use a single liner and leachate collection system. Waste put into waste pile subject to land ban regulations. | RCRA hazardous waste, non containerized accumulation of solid | 22CCR 66264.251 | 1,2, | | | May be an ARAR for soils stockpiled on-site prior to treatment or disposal. |
| Closure of waste piles | At closure, owner shall remove or decontaminate all waste residues and manage as hazardous waste. | | 22CCR 66264.258 (a) & (b) | 1,2 | | | Temporary non hazardous waste piles may be required. |
| Closure with no post closure care. | General performance standard requires elimination of need for further maintenance and control. | | 22CCR 66264.111 | 1,2 | | | Requirement may be an ARAR for sites where NFRAP determination is a removal action objective. |
| Clean closure | Removal or decontamination of all waste residues etc. and management of them as hazardous waste. | | 22CCR 66264.111 & 66264.228 a, b, e-k, m, n, o, p, & q | 1,2 | | | |
| Treatment when waste will be land disposed | Treatment of waste subject to ban on land disposal must attain levels achievable by best demonstrated technology (BDAT). | Placement of RCRA waste in landfill. surface impoundment, land treatment facility etc. | 22CCR 66268.40 & 42 | 1,2 | | | Applicable if RCRA waste. |

## Table A - 3
## Potential Federal Location-Specific ARARs

| Location | Requirement | Prerequisites | Citation | ARAR Determination | Comments |
|---|---|---|---|---|---|
| **National Historic Preservation Act, Sect 106** | | | | | |
| Historic project owned or controlled by federal agencies. | Action to preserve historic properties; Minimize harm to properties | | Substantive requirements of 36CFR 800 | Applicable | |
| **Coastal Zone Management Act** | | | | | |
| Coastal Zone | Conduct activities within approved state management programs. | | 16USC Sect 307(c); 15CFR 930 & 923.45 | ARAR (RA) | Not in Coastal Zone. |
| **Historic Sites, Buildings, and Antiquities Act** | | | | | |
| Historic Sites | Avoid undesirable impacts on landmarks. | Designated historic sites. | 16USC 461-467 | Applicable | |

Statutes and policies, and their citations, are provided as headings to identify general categories of potential ARARs for the convenience of the reader. Listing the statutes and policies does not indicate that DON accepts the entire statutes or policies as potential ARARs. Specific potential ARARs are addressed in the table below each general heading; only substantive requirements of the specific citations are considered potential ARARs.

## Appendix A
## List of Acronyms

A - Applicable
ARAR - Applicable or relevant and appropriate requirements
BDAT - Best demonstrated available technology
CCR - California Code of Regulations
CFR - Code of Federal Regulations
DTSC - Department of Toxic Substances Control
EPA - Environmental Protection Agency
NFRAP - No further remedial action planned
RA - Relevant and Appropriate
RCRA - Resource Conservation and Recovery Act
TBC - To be considered
USC - United States Code

# APPENDIX B

1. Culvert Sampling Analysis
2. Cost Estimate for Alternative #1
3. Cost Estimate for Alternative #2

# CULVERT SAMPLING ANALYSIS

Calscience
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# ANALYTICAL REPORT

| | | |
|---|---|---|
| Mare Island Naval Shipyard | Date Sampled: | 02/27/96 |
| Code 106.14, Stop T-56 | Date Received: | 03/01/96 |
| Building 1345 | Date Extracted: | 03/07/96 |
| Vallejo, CA 94592-5100 | Date Analyzed: | 03/09-12/96 |
| | Work Order No.: | 96-03-001 |
| Attn: Russ Finlinson | Method: | EPA 8015M |
| RE: Contract No. N00244-96-D-2009 | Page 1 of 1 | |

All total petroleum hydrocarbon concentrations are reported in mg/kg (ppm) using a 1:1 gasoline:diesel fuel mixture as a standard.

| Sample Number | Concentration | Reportable Limit |
|---|---|---|
| 0444-96 (Hunters Point/ Dry Dock 4 Location #1) | 434 | 10 |
| 0445-96 (Hunters Point/ Dry Dock 4 Location #2) | 90 | 10 |
| 0446-96 (Hunters Point/ Dry Dock 4 Location #3) | 127 | 10 |
| 0447-96 (Hunters Point/ Dry Dock 4 Location #4) | 108 | 10 |
| 0448-96 (Hunters Point/ Dry Dock 4 Location #5) | 127 | 10 |
| 0449-96 (Hunters Point/ Dry Dock 4 Location #6) | 74 | 10 |
| 0450-96 (Hunters Point/ Dry Dock 4 Location #7) | 398 | 10 |
| 0451-96 (Hunters Point/ Dry Dock 4 Location #8) | 76 | 10 |
| Method Blank | ND | 10 |

Reviewed and Approved _____ on 03/22/1996
William H. Christensen
Deliverables Manager

ND denotes not detected at indicated reportable limit.

Each sample was received by CEL chilled, intact, and with chain-of-custody attached.

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# ANALYTICAL REPORT

Mare Island Naval Shipyard
Code 106.14, Stop T-56
Building 1345
Vallejo, CA 94592-5100

Attn: Russ Finlinson
RE: Contract No. N00244-96-D-2009

Date Sampled: 02/27/96
Date Received: 03/01/96
Date Extracted: 03/05/96
Date Analyzed: 03/11/96
Work Order No.: 96-03-001
Method: EPA 8080A (PCBs)


All concentrations are reported in µg/kg (ppb).

**Sample Number: 0444-96 (Hunters Point/Dry Dock 4 Location #1)**

| Analyte | Concentration | Reportable Limit |
|---|---|---|
| Aroclor-1016 | ND | 100 |
| Aroclor-1221 | ND | 100 |
| Aroclor-1232 | ND | 100 |
| Aroclor-1242 | ND | 100 |
| Aroclor-1248 | ND | 100 |
| Aroclor-1254 | ND | 100 |
| Aroclor-1260 | 1040 | 100 |
| Aroclor-1262 | ND | 100 |

**Sample Number: 0445-96 (Hunters Point/Dry Dock 4 Location #2)**

| | | |
|---|---|---|
| Aroclor-1016 | ND | 100 |
| Aroclor-1221 | ND | 100 |
| Aroclor-1232 | ND | 100 |
| Aroclor-1242 | ND | 100 |
| Aroclor-1248 | ND | 100 |
| Aroclor-1254 | ND | 100 |
| Aroclor-1260 | 483 | 100 |
| Aroclor-1262 | ND | 100 |

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## ANALYTICAL REPORT

Mare Island Naval Shipyard
Code 106.14, Stop T-56
Building 1345
Vallejo, CA 94592-5100

Attn: Russ Finlinson
RE: Contract No. N00244-96-D-2009

Date Sampled: 02/27/96
Date Received: 03/01/96
Date Extracted: 03/05/96
Date Analyzed: 03/11/96
Work Order No.: 96-03-001
Method: EPA 8080A (PCBs)


All concentrations are reported in µg/kg (ppb).

**Sample Number: 0446-96 (Hunters Point/Dry Dock 4 Location #3)**

| Analyte | Concentration | Reportable Limit |
|---|---|---|
| Aroclor-1016 | ND | 100 |
| Aroclor-1221 | ND | 100 |
| Aroclor-1232 | ND | 100 |
| Aroclor-1242 | ND | 100 |
| Aroclor-1248 | ND | 100 |
| Aroclor-1254 | ND | 100 |
| Aroclor-1260 | 131 | 100 |
| Aroclor-1262 | ND | 100 |

**Sample Number: 0447-96 (Hunters Point/Dry Dock 4 Location #4)**

| | | |
|---|---|---|
| Aroclor-1016 | ND | 100 |
| Aroclor-1221 | ND | 100 |
| Aroclor-1232 | ND | 100 |
| Aroclor-1242 | ND | 100 |
| Aroclor-1248 | ND | 100 |
| Aroclor-1254 | ND | 100 |
| Aroclor-1260 | ND | 100 |
| Aroclor-1262 | ND | 100 |

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## ANALYTICAL REPORT

| | | | |
|---|---|---|---|
| Mare Island Naval Shipyard | | Date Sampled: | 02/27/96 |
| Code 106.14, Stop T-56 | | Date Received: | 03/01/96 |
| Building 1345 | | Date Extracted: | 03/05/96 |
| Vallejo, CA 94592-5100 | | Date Analyzed: | 03/11/96 |
| | | Work Order No.: | 96-03-001 |
| Attn: Russ Finlinson | | Method: | EPA 8080A (PCBs) |
| RE: Contract No. N00244-96-D-2009 | | Page 3 of 5 | |

All concentrations are reported in µg/kg (ppb).

**Sample Number: 0448-96 (Hunters Point/Dry Dock 4 Location #5)**

| Analyte | Concentration | Reportable Limit |
|---|---|---|
| Aroclor-1016 | ND | 500 |
| Aroclor-1221 | ND | 500 |
| Aroclor-1232 | ND | 500 |
| Aroclor-1242 | ND | 500 |
| Aroclor-1248 | ND | 500 |
| Aroclor-1254 | ND | 500 |
| Aroclor-1260 | ND | 500 |
| Aroclor-1262 | ND | 500 |

**Sample Number: 0449-96 (Hunters Point/Dry Dock 4 Location #6)**

| | | |
|---|---|---|
| Aroclor-1016 | ND | 100 |
| Aroclor-1221 | ND | 100 |
| Aroclor-1232 | ND | 100 |
| Aroclor-1242 | ND | 100 |
| Aroclor-1248 | ND | 100 |
| Aroclor-1254 | ND | 100 |
| Aroclor-1260 | ND | 100 |
| Aroclor-1262 | ND | 100 |

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# ANALYTICAL REPORT

Mare Island Naval Shipyard
Code 106.14, Stop T-56
Building 1345
Vallejo, CA 94592-5100

Attn: Russ Finlinson
RE: Contract No. N00244-96-D-2009

Date Sampled: 02/27/96
Date Received: 03/01/96
Date Extracted: 03/05/96
Date Analyzed: 03/11/96
Work Order No.: 96-03-001
Method: EPA 8080A (PCBs)


All concentrations are reported in µg/kg (ppb).

**Sample Number: 0450-96 (Hunters Point/Dry Dock 4 Location #7)**

| Analyte | Concentration | Reportable Limit |
|---|---|---|
| Aroclor-1016 | ND | 100 |
| Aroclor-1221 | ND | 100 |
| Aroclor-1232 | ND | 100 |
| Aroclor-1242 | ND | 100 |
| Aroclor-1248 | ND | 100 |
| Aroclor-1254 | ND | 100 |
| Aroclor-1260 | 561 | 100 |
| Aroclor-1262 | ND | 100 |

**Sample Number: 0451-96 (Hunters Point/Dry Dock 4 Location #8)**

| | | |
|---|---|---|
| Aroclor-1016 | ND | 100 |
| Aroclor-1221 | ND | 100 |
| Aroclor-1232 | ND | 100 |
| Aroclor-1242 | ND | 100 |
| Aroclor-1248 | ND | 100 |
| Aroclor-1254 | ND | 100 |
| Aroclor-1260 | 192 | 100 |
| Aroclor-1262 | ND | 100 |

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## ANALYTICAL REPORT

| | |
|---|---|
| Mare Island Naval Shipyard | Date Sampled: 02/27/96 |
| Code 106.14, Stop T-56 | Date Received: 03/01/96 |
| Building 1345 | Date Extracted: 03/05/96 |
| Vallejo, CA 94592-5100 | Date Analyzed: 03/11/96 |
| | Work Order No.: 96-03-001 |
| Attn: Russ Finlinson | Method: EPA 8080A (PCBs) |
| RE: Contract No. N00244-96-D-2009 | Page 5 of 5 |

All concentrations are reported in µg/kg (ppb).

**Sample Number: Method Blank**

| Analyte | Concentration | Reportable Limit |
|---|---|---|
| Aroclor-1016 | ND | 100 |
| Aroclor-1221 | ND | 100 |
| Aroclor-1232 | ND | 100 |
| Aroclor-1242 | ND | 100 |
| Aroclor-1248 | ND | 100 |
| Aroclor-1254 | ND | 100 |
| Aroclor-1260 | ND | 100 |
| Aroclor-1262 | ND | 100 |

Reviewed and Approved _____ on 03/22/1996

William H. Christensen
Deliverables Manager

ND denotes not detected at indicated reportable limit.

Each sample was received by CEL chilled, intact, and with chain-of-custody attached.

Calscience Environmental Laboratories, Inc.

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# QUALITY ASSURANCE SUMMARY

Method EPA 8015M - G & D

| | | | |
|---|---|---|---|
| Mare Island Naval Shipyard | | Work Order No.: | 96-03-001 |
| Page 1 of 1 | | Date Analyzed: | 03/09/96 |

## LCS/LCS Duplicate

| Analyte | LCS%REC | LCSD%REC | Control Limits | %RPD | Control Limits |
|---|---|---|---|---|---|
| Total Petroleum Hydrocarbons | 68 | 66 | 55 - 135 | 3 | 0 - 30 |

Reviewed and approved: _____ on 03/22/1996

William H. Christensen
Deliverables Manager

7440 Lincoln Way, Garden Grove, CA 92641-1432 • TEL: (714) 895-5494 • FAX: (714) 894-7501

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# QUALITY ASSURANCE SUMMARY

Method EPA 8080A (PCBs)

Mare Island Naval Shipyard — Work Order No.: 96-03-001
Page 1 of 1 — Date Analyzed: 03/11/96

## LCS/LCS Duplicate

| Analyte | LCS%REC | LCSD%REC | Control Limits | %RPD | Control Limits |
|---|---|---|---|---|---|
| Aroclor-1260 | 56 | 59 | 50 - 135 | 5 | 0 - 25 |

## Surrogate Recoveries (in %)

| Sample Number | S1 | S2 | Sample Number | S1 |
|---|---|---|---|---|
| 0444-96 | 136 Note 1 | 369 Note 1 | 0448-96 | 84 |
| 0445-96 | 174 Note 1 | 334 Note 1 | 0449-96 | 65 |
| 0446-96 | 241 Note 1 | 344 Note 1 | 0450-96 | 99 |
| 0447-96 | 51 | | 0451-96 | 109 |
| Method Blank | 107 | 88 | | |

| Surrogate Compound | %REC Acceptable Limits |
|---|---|
| S1 > Decachlorobiphenyl (DCB) | 50 - 130 |
| S2 > 2,4,5,6-Tetrachloro-m-Xylene | 50 - 130 |

Note 1. The surrogate recovery was out of control due to a matrix interference effect. The batch method blank surrogate was in control and, hence, the associated sample data was reported with no further corrective action required.

Reviewed and approved: _____ on 03 / 21 /1996
William H. Christensen
Deliverables Manager

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# QUALITY ASSURANCE SUMMARY

ICP / GF Metals (Solids)

Mare Island Naval Shipyard — Work Order No.: 96-03-001
Page 1 of 1 — Date Analyzed: 03/05-07/96

## Matrix Spike

Sample Spiked: 96-03-004-2

| Analyte | Method | Sample Conc. | Spike Added | MS Conc. | %REC | Control Limits |
|---|---|---|---|---|---|---|
| Mercury | EPA 7471 | 2.41 | 2.50 | 4.84 | 97 | 50 - 130 |

## Matrix Spike

Sample Spiked: 96-02-478-1

| Analyte | Method | Sample Conc. | Spike Added | MS Conc. | %REC | Control Limits |
|---|---|---|---|---|---|---|
| Antimony | EPA 6010A | 11.1 | 100 | 20.1 | 9[Note 1] | 80 - 120 |
| Arsenic | EPA 7060A | 3.71 | 2.50 | 6.06 | 94 | 50 - 130 |
| Barium | EPA 6010A | 135 | 100 | 223 | 88 | 80 - 120 |
| Beryllium | EPA 6010A | ND | 100 | 88.2 | 88 | 80 - 120 |
| Cadmium | EPA 6010A | 2 | 100 | 84.5 | 83 | 80 - 120 |
| Chromium | EPA 6010A | 48.8 | 100 | 134 | 85 | 80 - 120 |
| Cobalt | EPA 6010A | 12.2 | 100 | 98.1 | 86 | 80 - 120 |
| Copper | EPA 6010A | 34.7 | 100 | 122 | 87 | 80 - 120 |
| Lead | EPA 6010A | 15.4 | 100 | 95.9 | 81 | 80 - 120 |
| Molybdenum | EPA 6010A | ND | 100 | 78.2 | 78[Note 1] | 80 - 120 |
| Nickel | EPA 6010A | 39.2 | 100 | 161 | 122[Note 1] | 80 - 120 |
| Selenium | EPA 7740 | ND | 2.50 | 2.30 | 92 | 50 - 130 |
| Silver | EPA 6010A | ND | 50 | 7.87 | 16[Note 1] | 80 - 120 |
| Thallium | EPA 7841 | ND | 0.050 | 0.020 | 40[Note 1] | 50 - 130 |
| Vanadium | EPA 6010A | 48.8 | 100 | 136 | 87 | 80 - 120 |
| Zinc | EPA 6010A | 265 | 100 | 372 | 107 | 80 - 120 |

Note 1. The MS associated with this batch of samples was out of control due to a matrix interference effect. The associated batch LCS was in control and, hence, the associated sample data was reported with no further corrective action required.

Reviewed and approved: _____ on 03/22/1996
William H. Christensen
Deliverables Manager

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# QUALITY ASSURANCE SUMMARY

ICP / GF Metals (Solids) - STLC

Mare Island Naval Shipyard — Work Order No.: 96-03-001
Page 1 of 1 — Date Analyzed: 04/01/96

**Matrix Spike**
Sample Spiked: 96-03-501-1

| Analyte | Method | Sample Conc. | Spike Added | MS Conc. | %REC | Control Limits |
|---|---|---|---|---|---|---|
| Chromium | EPA 6010A | ND | 20.0 | 20.1 | 101 | 80 - 120 |
| Copper | EPA 6010A | 10.3 | 20.0 | 31.0 | 104 | 80 - 120 |
| Lead | EPA 6010A | ND | 20.0 | 20.3 | 102 | 80 - 120 |

Reviewed and approved: _____ on 05/16/1996
William H. Christensen
Deliverables Manager

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# QUALITY ASSURANCE SUMMARY

ICP / GF Metals (Solids) - STLC

Mare Island Naval Shipyard — Work Order No.: 96-03-001
Page 1 of 1 — Date Analyzed: 03/08/96

**Matrix Spike**

Sample Spiked: 0444-96 (Hunters Point/Dry Dock 4 Location #1)

| Analyte | Method | Sample Conc. | Spike Added | MS Conc. | %REC | Control Limits |
|---|---|---|---|---|---|---|
| Chromium | EPA 6010A | 9 | 20 | 26.9 | 90 | 80 - 120 |
| Copper | EPA 6010A | ND | 20 | 19.7 | 99 | 80 - 120 |
| Lead | EPA 6010A | 17.6 | 20 | 33.1 | 77[Note 1] | 80 - 120 |

Note 1. The MS associated with this batch of samples was out of control due to a matrix interference effect. The associated batch LCS was in control and, hence, the associated sample data was reported with no further corrective action required.

Reviewed and approved: _____ on 03/22/1996

William H. Christensen
Deliverables Manager

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# QUALITY ASSURANCE SUMMARY

ICP / GF Metals (Solids) - TCLP

Mare Island Naval Shipyard — Work Order No.: 96-03-001
Page 1 of 1 — Date Analyzed: 03/08/96

## Matrix Spike

Sample Spiked: 0444-96 (Hunters Point/Dry Dock 4 Location #1)

| Analyte | Method | Sample Conc. | Spike Added | MS Conc. | %REC | Control Limits |
|---|---|---|---|---|---|---|
| Chromium | EPA 6010A | ND | 20 | 30.6 | 153[Note 1] | 80 - 120 |
| Lead | EPA 6010A | ND | 20 | 30.2 | 151[Note 1] | 80 - 120 |

Note 1. The MS associated with this batch of samples was out of control due to a matrix interference effect. The associated batch LCS was in control and, hence, the associated sample data was reported with no further corrective action required.

Reviewed and approved: _____ on 03/22/1996

William H. Christensen
Deliverables Manager

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# ANALYTICAL REPORT

| | | | |
|---|---|---|---|
| Mare Island Naval Shipyard | | Date Sampled: | 02/27/96 |
| Code 106.14, Stop T-56 | | Date Received: | 03/01/96 |
| Building 1345 | | Date Extracted: | 03/28/96 |
| Vallejo, CA 94592-5100 | | Date Analyzed: | 04/01/96 |
| | | Work Order No.: | 96-03-001 |
| Attn: Russ Finlinson | | | |
| RE: Contract No. N00244-96-D-2009 | | Page 1 of 2 | |

All concentrations are reported in mg/L (ppm). Analyses for metals were conducted on a D.I. WET extract.

| Analyte | Method | Concentration | Reportable Limit |
|---|---|---|---|
| **Sample Number: 0445-96 (Hunters Point/Dry Dock 4 Location #2)** | | | |
| Chromium | EPA 6010A | ND | 5.0 |
| Copper | EPA 6010A | ND | 5.0 |
| Lead | EPA 6010A | ND | 5.0 |
| **Sample Number: 0446-96 (Hunters Point/Dry Dock 4 Location #3)** | | | |
| Chromium | EPA 6010A | ND | 5.0 |
| Copper | EPA 6010A | ND | 5.0 |
| Lead | EPA 6010A | ND | 5.0 |
| **Sample Number: 0448-96 (Hunters Point/Dry Dock 4 Location #5)** | | | |
| Chromium | EPA 6010A | ND | 5.0 |
| Copper | EPA 6010A | ND | 5.0 |
| Lead | EPA 6010A | ND | 5.0 |
| **Sample Number: Method Blank** | | | |
| Chromium | EPA 6010A | ND | 5.0 |
| Copper | EPA 6010A | ND | 5.0 |
| Lead | EPA 6010A | ND | 5.0 |

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## ANALYTICAL REPORT

| | | | |
|---|---|---|---|
| Mare Island Naval Shipyard | | Date Sampled: | 02/27/96 |
| Code 106.14, Stop T-56 | | Date Received: | 03/01/96 |
| Building 1345 | | Date Extracted: | 03/28/96 |
| Vallejo, CA 94592-5100 | | Date Analyzed: | 04/01/96 |
| | | Work Order No.: | 96-03-001 |
| Attn: Russ Finlinson | | | |
| RE: Contract No. N00244-96-D-2009 | | Page 2 of 2 | |

All concentrations are reported in mg/L (ppm). Analyses for metals were conducted on a D.I. WET extract.

**QA/QC**

| Analyte | Method | Sample Conc. | Duplicate Conc. | %RPD | Control Limits (%) |
|---|---|---|---|---|---|
| **Sample Number: 96-03-501-1 (Duplicate)** | | | | | |
| Chromium | EPA 6010A | ND | ND | NA | 0 - 20 |
| Copper | EPA 6010A | 10.3 | 10.7 | 4 | 0 - 20 |
| Lead | EPA 6010A | ND | ND | NA | 0 - 20 |

Reviewed and Approved _____ on 05/16/1996
William H. Christensen
Deliverables Manager

ND denotes not detected at indicated reportable limit.

Each sample was received by CEL chilled, intact, and with chain-of-custody attached.

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## ANALYTICAL REPORT

| | | | |
|---|---|---|---|
| Mare Island Naval Shipyard | | Date Sampled: | 02/27/96 |
| Code 106.14, Stop T-56 | | Date Received: | 03/01/96 |
| Building 1345 | | Date Extracted: | 03/08/96 |
| Vallejo, CA 94592-5100 | | Date Analyzed: | 03/08/96 |
| | | Work Order No.: | 96-03-001 |
| Attn: Russ Finlinson | | Method: | EPA 8240B |
| RE: Contract No. N00244-96-D-2009 | | Page 1 of 9 | |

All concentrations are reported in µg/kg (ppb).

### Sample Number: 0444-96 (Hunters Point/Dry Dock 4 Location #1)

| Analyte | Conc | Reportable Limit | Analyte | Conc | Reportable Limit |
|---|---|---|---|---|---|
| Acetone | ND | 500 | Cis-1,2-Dichloroethene | ND | 100 |
| Benzene | ND | 100 | Trans-1,2-Dichloroethene | ND | 100 |
| Bromodichloromethane | ND | 100 | 1,2-Dichloropropane | ND | 100 |
| Bromoform | ND | 100 | Cis-1,3-Dichloropropene | ND | 100 |
| Bromomethane | ND | 200 | Trans-1,3-Dichloropropene | ND | 100 |
| 2-Butanone | ND | 200 | Ethylbenzene | 352 | 100 |
| Carbon Disulfide | ND | 100 | 2-Hexanone | ND | 200 |
| Carbon Tetrachloride | ND | 100 | Methylene Chloride | ND | 100 |
| Chlorobenzene | ND | 100 | 4-Methyl-2-Pentanone | ND | 200 |
| Chloroethane | ND | 100 | Styrene | ND | 100 |
| 2-Chloroethyl Vinyl Ether | ND | 100 | 1,1,2,2-Tetrachloroethane | ND | 100 |
| Chloroform | ND | 100 | Tetrachloroethene | ND | 100 |
| Chloromethane | ND | 100 | Toluene | ND | 100 |
| 1,3-Dichlorobenzene | ND | 100 | 1,1,1-Trichloroethane | ND | 100 |
| 1,4-Dichlorobenzene | ND | 100 | 1,1,2-Trichloroethane | ND | 100 |
| 1,2-Dichlorobenzene | ND | 100 | Trichloroethene | ND | 100 |
| Dibromochloromethane | ND | 100 | Trichlorofluoromethane | ND | 100 |
| Dichlorodifluoromethane | ND | 100 | Vinyl Acetate | ND | 100 |
| 1,1-Dichloroethane | ND | 100 | Vinyl Chloride | ND | 100 |
| 1,2-Dichloroethane | ND | 100 | Total Xylenes | 519 | 200 |
| 1,1-Dichloroethene | ND | 100 | | | |

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# ANALYTICAL REPORT

| | | | |
|---|---|---|---|
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| Code 106.14, Stop T-56 | | Date Received: | 03/01/96 |
| Building 1345 | | Date Extracted: | 03/08/96 |
| Vallejo, CA 94592-5100 | | Date Analyzed: | 03/08/96 |
| | | Work Order No.: | 96-03-001 |
| Attn: Russ Finlinson | | Method: | EPA 8240B |
| RE: Contract No. N00244-96-D-2009 | | Page 2 of 9 | |

All concentrations are reported in µg/kg (ppb).

## Sample Number: 0445-96 (Hunters Point/Dry Dock 4 Location #2)

| Analyte | Conc | Reportable Limit | Analyte | Conc | Reportable Limit |
|---|---|---|---|---|---|
| Acetone | ND | 500 | Cis-1,2-Dichloroethene | ND | 100 |
| Benzene | ND | 100 | Trans-1,2-Dichloroethene | ND | 100 |
| Bromodichloromethane | ND | 100 | 1,2-Dichloropropane | ND | 100 |
| Bromoform | ND | 100 | Cis-1,3-Dichloropropene | ND | 100 |
| Bromomethane | ND | 200 | Trans-1,3-Dichloropropene | ND | 100 |
| 2-Butanone | ND | 200 | Ethylbenzene | 147 | 100 |
| Carbon Disulfide | ND | 100 | 2-Hexanone | ND | 200 |
| Carbon Tetrachloride | ND | 100 | Methylene Chloride | ND | 100 |
| Chlorobenzene | ND | 100 | 4-Methyl-2-Pentanone | ND | 200 |
| Chloroethane | ND | 100 | Styrene | ND | 100 |
| 2-Chloroethyl Vinyl Ether | ND | 100 | 1,1,2,2-Tetrachloroethane | ND | 100 |
| Chloroform | ND | 100 | Tetrachloroethene | ND | 100 |
| Chloromethane | ND | 100 | Toluene | ND | 100 |
| 1,3-Dichlorobenzene | ND | 100 | 1,1,1-Trichloroethane | ND | 100 |
| 1,4-Dichlorobenzene | ND | 100 | 1,1,2-Trichloroethane | ND | 100 |
| 1,2-Dichlorobenzene | ND | 100 | Trichloroethene | ND | 100 |
| Dibromochloromethane | ND | 100 | Trichlorofluoromethane | ND | 100 |
| Dichlorodifluoromethane | ND | 100 | Vinyl Acetate | ND | 100 |
| 1,1-Dichloroethane | ND | 100 | Vinyl Chloride | ND | 100 |
| 1,2-Dichloroethane | ND | 100 | Total Xylenes | 357 | 200 |
| 1,1-Dichloroethene | ND | 100 | | | |

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# ANALYTICAL REPORT

| | | | |
|---|---|---|---|
| Mare Island Naval Shipyard | | Date Sampled: | 02/27/96 |
| Code 106.14, Stop T-56 | | Date Received: | 03/01/96 |
| Building 1345 | | Date Extracted: | 03/08/96 |
| Vallejo, CA 94592-5100 | | Date Analyzed: | 03/08/96 |
| | | Work Order No.: | 96-03-001 |
| Attn: Russ Finlinson | | Method: | EPA 8240B |
| RE: Contract No. N00244-96-D-2009 | | Page 3 of 9 | |

All concentrations are reported in µg/kg (ppb).

## Sample Number: 0446-96 (Hunters Point/Dry Dock 4 Location #3)

| Analyte | Conc | Reportable Limit | Analyte | Conc | Reportable Limit |
|---|---|---|---|---|---|
| Acetone | ND | 500 | Cis-1,2-Dichloroethene | ND | 100 |
| Benzene | ND | 100 | Trans-1,2-Dichloroethene | ND | 100 |
| Bromodichloromethane | ND | 100 | 1,2-Dichloropropane | ND | 100 |
| Bromoform | ND | 100 | Cis-1,3-Dichloropropene | ND | 100 |
| Bromomethane | ND | 200 | Trans-1,3-Dichloropropene | ND | 100 |
| 2-Butanone | ND | 200 | Ethylbenzene | 121 | 100 |
| Carbon Disulfide | ND | 100 | 2-Hexanone | ND | 200 |
| Carbon Tetrachloride | ND | 100 | Methylene Chloride | ND | 100 |
| Chlorobenzene | ND | 100 | 4-Methyl-2-Pentanone | ND | 200 |
| Chloroethane | ND | 100 | Styrene | ND | 100 |
| 2-Chloroethyl Vinyl Ether | ND | 100 | 1,1,2,2-Tetrachloroethane | ND | 100 |
| Chloroform | ND | 100 | Tetrachloroethene | ND | 100 |
| Chloromethane | ND | 100 | Toluene | ND | 100 |
| 1,3-Dichlorobenzene | ND | 100 | 1,1,1-Trichloroethane | ND | 100 |
| 1,4-Dichlorobenzene | ND | 100 | 1,1,2-Trichloroethane | ND | 100 |
| 1,2-Dichlorobenzene | ND | 100 | Trichloroethene | ND | 100 |
| Dibromochloromethane | ND | 100 | Trichlorofluoromethane | ND | 100 |
| Dichlorodifluoromethane | ND | 100 | Vinyl Acetate | ND | 100 |
| 1,1-Dichloroethane | ND | 100 | Vinyl Chloride | ND | 100 |
| 1,2-Dichloroethane | ND | 100 | Total Xylenes | 578 | 200 |
| 1,1-Dichloroethene | ND | 100 | | | |

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## ANALYTICAL REPORT

| | | |
|---|---|---|
| Mare Island Naval Shipyard | Date Sampled: | 02/27/96 |
| Code 106.14, Stop T-56 | Date Received: | 03/01/96 |
| Building 1345 | Date Extracted: | 03/08/96 |
| Vallejo, CA 94592-5100 | Date Analyzed: | 03/08/96 |
| | Work Order No.: | 96-03-001 |
| Attn: Russ Finlinson | Method: | EPA 8240B |
| RE: Contract No. N00244-96-D-2009 | Page 4 of 9 | |

All concentrations are reported in µg/kg (ppb).

### Sample Number: 0447-96 (Hunters Point/Dry Dock 4 Location #4)

| Analyte | Conc | Reportable Limit | Analyte | Conc | Reportable Limit |
|---|---|---|---|---|---|
| Acetone | ND | 500 | Cis-1,2-Dichloroethene | ND | 100 |
| Benzene | ND | 100 | Trans-1,2-Dichloroethene | ND | 100 |
| Bromodichloromethane | ND | 100 | 1,2-Dichloropropane | ND | 100 |
| Bromoform | ND | 100 | Cis-1,3-Dichloropropene | ND | 100 |
| Bromomethane | ND | 200 | Trans-1,3-Dichloropropene | ND | 100 |
| 2-Butanone | ND | 200 | Ethylbenzene | 587 | 100 |
| Carbon Disulfide | ND | 100 | 2-Hexanone | ND | 200 |
| Carbon Tetrachloride | ND | 100 | Methylene Chloride | ND | 100 |
| Chlorobenzene | ND | 100 | 4-Methyl-2-Pentanone | ND | 200 |
| Chloroethane | ND | 100 | Styrene | ND | 100 |
| 2-Chloroethyl Vinyl Ether | ND | 100 | 1,1,2,2-Tetrachloroethane | ND | 100 |
| Chloroform | ND | 100 | Tetrachloroethene | ND | 100 |
| Chloromethane | ND | 100 | Toluene | ND | 100 |
| 1,3-Dichlorobenzene | ND | 100 | 1,1,1-Trichloroethane | ND | 100 |
| 1,4-Dichlorobenzene | ND | 100 | 1,1,2-Trichloroethane | ND | 100 |
| 1,2-Dichlorobenzene | ND | 100 | Trichloroethene | ND | 100 |
| Dibromochloromethane | ND | 100 | Trichlorofluoromethane | ND | 100 |
| Dichlorodifluoromethane | ND | 100 | Vinyl Acetate | ND | 100 |
| 1,1-Dichloroethane | ND | 100 | Vinyl Chloride | ND | 100 |
| 1,2-Dichloroethane | ND | 100 | Total Xylenes | 3620 | 200 |
| 1,1-Dichloroethene | ND | 100 | | | |

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# ANALYTICAL REPORT

| | | | |
|---|---|---|---|
| Mare Island Naval Shipyard | | Date Sampled: | 02/27/96 |
| Code 106.14, Stop T-56 | | Date Received: | 03/01/96 |
| Building 1345 | | Date Extracted: | 03/08/96 |
| Vallejo, CA 94592-5100 | | Date Analyzed: | 03/08/96 |
| | | Work Order No.: | 96-03-001 |
| Attn: Russ Finlinson | | Method: | EPA 8240B |
| RE: Contract No. N00244-96-D-2009 | | Page 5 of 9 | |

All concentrations are reported in µg/kg (ppb).

## Sample Number: 0448-96 (Hunters Point/Dry Dock 4 Location #5)

| Analyte | Conc | Reportable Limit | Analyte | Conc | Reportable Limit |
|---|---|---|---|---|---|
| Acetone | ND | 500 | Cis-1,2-Dichloroethene | ND | 100 |
| Benzene | ND | 100 | Trans-1,2-Dichloroethene | ND | 100 |
| Bromodichloromethane | ND | 100 | 1,2-Dichloropropane | ND | 100 |
| Bromoform | ND | 100 | Cis-1,3-Dichloropropene | ND | 100 |
| Bromomethane | ND | 200 | Trans-1,3-Dichloropropene | ND | 100 |
| 2-Butanone | ND | 200 | Ethylbenzene | 291 | 100 |
| Carbon Disulfide | ND | 100 | 2-Hexanone | ND | 200 |
| Carbon Tetrachloride | ND | 100 | Methylene Chloride | ND | 100 |
| Chlorobenzene | ND | 100 | 4-Methyl-2-Pentanone | ND | 200 |
| Chloroethane | ND | 100 | Styrene | ND | 100 |
| 2-Chloroethyl Vinyl Ether | ND | 100 | 1,1,2,2-Tetrachloroethane | ND | 100 |
| Chloroform | ND | 100 | Tetrachloroethene | ND | 100 |
| Chloromethane | ND | 100 | Toluene | ND | 100 |
| 1,3-Dichlorobenzene | ND | 100 | 1,1,1-Trichloroethane | ND | 100 |
| 1,4-Dichlorobenzene | ND | 100 | 1,1,2-Trichloroethane | ND | 100 |
| 1,2-Dichlorobenzene | ND | 100 | Trichloroethene | ND | 100 |
| Dibromochloromethane | ND | 100 | Trichlorofluoromethane | ND | 100 |
| Dichlorodifluoromethane | ND | 100 | Vinyl Acetate | ND | 100 |
| 1,1-Dichloroethane | ND | 100 | Vinyl Chloride | ND | 100 |
| 1,2-Dichloroethane | ND | 100 | Total Xylenes | 787 | 200 |
| 1,1-Dichloroethene | ND | 100 | | | |

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# ANALYTICAL REPORT

| | | | |
|---|---|---|---|
| Mare Island Naval Shipyard | | Date Sampled: | 02/27/96 |
| Code 106.14, Stop T-56 | | Date Received: | 03/01/96 |
| Building 1345 | | Date Extracted: | 03/08/96 |
| Vallejo, CA 94592-5100 | | Date Analyzed: | 03/08/96 |
| | | Work Order No.: | 96-03-001 |
| Attn: Russ Finlinson | | Method: | EPA 8240B |
| RE: Contract No. N00244-96-D-2009 | | Page 6 of 9 | |

All concentrations are reported in µg/kg (ppb).

## Sample Number: 0449-96 (Hunters Point/Dry Dock 4 Location #6)

| Analyte | Conc | Reportable Limit | Analyte | Conc | Reportable Limit |
|---|---|---|---|---|---|
| Acetone | ND | 500 | Cis-1,2-Dichloroethene | ND | 100 |
| Benzene | ND | 100 | Trans-1,2-Dichloroethene | ND | 100 |
| Bromodichloromethane | ND | 100 | 1,2-Dichloropropane | ND | 100 |
| Bromoform | ND | 100 | Cis-1,3-Dichloropropene | ND | 100 |
| Bromomethane | ND | 200 | Trans-1,3-Dichloropropene | ND | 100 |
| 2-Butanone | ND | 200 | Ethylbenzene | 264 | 100 |
| Carbon Disulfide | ND | 100 | 2-Hexanone | ND | 200 |
| Carbon Tetrachloride | ND | 100 | Methylene Chloride | ND | 100 |
| Chlorobenzene | ND | 100 | 4-Methyl-2-Pentanone | ND | 200 |
| Chloroethane | ND | 100 | Styrene | ND | 100 |
| 2-Chloroethyl Vinyl Ether | ND | 100 | 1,1,2,2-Tetrachloroethane | ND | 100 |
| Chloroform | ND | 100 | Tetrachloroethene | ND | 100 |
| Chloromethane | ND | 100 | Toluene | ND | 100 |
| 1,3-Dichlorobenzene | ND | 100 | 1,1,1-Trichloroethane | ND | 100 |
| 1,4-Dichlorobenzene | ND | 100 | 1,1,2-Trichloroethane | ND | 100 |
| 1,2-Dichlorobenzene | ND | 100 | Trichloroethene | ND | 100 |
| Dibromochloromethane | ND | 100 | Trichlorofluoromethane | ND | 100 |
| Dichlorodifluoromethane | ND | 100 | Vinyl Acetate | ND | 100 |
| 1,1-Dichloroethane | ND | 100 | Vinyl Chloride | ND | 100 |
| 1,2-Dichloroethane | ND | 100 | Total Xylenes | 698 | 200 |
| 1,1-Dichloroethene | ND | 100 | | | |

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# ANALYTICAL REPORT

| | | | |
|---|---|---|---|
| Mare Island Naval Shipyard | | Date Sampled: | 02/27/96 |
| Code 106.14, Stop T-56 | | Date Received: | 03/01/96 |
| Building 1345 | | Date Extracted: | 03/08/96 |
| Vallejo, CA 94592-5100 | | Date Analyzed: | 03/08/96 |
| | | Work Order No.: | 96-03-001 |
| Attn: Russ Finlinson | | Method: | EPA 8240B |
| RE: Contract No. N00244-96-D-2009 | | Page 7 of 9 | |

All concentrations are reported in µg/kg (ppb).

## Sample Number: 0450-96 (Hunters Point/Dry Dock 4 Location #7)

| Analyte | Conc | Reportable Limit | Analyte | Conc | Reportable Limit |
|---|---|---|---|---|---|
| Acetone | ND | 500 | Cis-1,2-Dichloroethene | ND | 100 |
| Benzene | ND | 100 | Trans-1,2-Dichloroethene | ND | 100 |
| Bromodichloromethane | ND | 100 | 1,2-Dichloropropane | ND | 100 |
| Bromoform | ND | 100 | Cis-1,3-Dichloropropene | ND | 100 |
| Bromomethane | ND | 200 | Trans-1,3-Dichloropropene | ND | 100 |
| 2-Butanone | ND | 200 | Ethylbenzene | ND | 100 |
| Carbon Disulfide | ND | 100 | 2-Hexanone | ND | 200 |
| Carbon Tetrachloride | ND | 100 | Methylene Chloride | ND | 100 |
| Chlorobenzene | ND | 100 | 4-Methyl-2-Pentanone | ND | 200 |
| Chloroethane | ND | 100 | Styrene | ND | 100 |
| 2-Chloroethyl Vinyl Ether | ND | 100 | 1,1,2,2-Tetrachloroethane | ND | 100 |
| Chloroform | ND | 100 | Tetrachloroethene | ND | 100 |
| Chloromethane | ND | 100 | Toluene | ND | 100 |
| 1,3-Dichlorobenzene | ND | 100 | 1,1,1-Trichloroethane | ND | 100 |
| 1,4-Dichlorobenzene | ND | 100 | 1,1,2-Trichloroethane | ND | 100 |
| 1,2-Dichlorobenzene | ND | 100 | Trichloroethene | ND | 100 |
| Dibromochloromethane | ND | 100 | Trichlorofluoromethane | ND | 100 |
| Dichlorodifluoromethane | ND | 100 | Vinyl Acetate | ND | 100 |
| 1,1-Dichloroethane | ND | 100 | Vinyl Chloride | ND | 100 |
| 1,2-Dichloroethane | ND | 100 | Total Xylenes | 735 | 200 |
| 1,1-Dichloroethene | ND | 100 | | | |

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# ANALYTICAL REPORT

| | | | |
|---|---|---|---|
| Mare Island Naval Shipyard | | Date Sampled: | 02/27/96 |
| Code 106.14, Stop T-56 | | Date Received: | 03/01/96 |
| Building 1345 | | Date Extracted: | 03/08/96 |
| Vallejo, CA 94592-5100 | | Date Analyzed: | 03/08/96 |
| | | Work Order No.: | 96-03-001 |
| Attn: Russ Finlinson | | Method: | EPA 8240B |
| RE: Contract No. N00244-96-D-2009 | | Page 8 of 9 | |

All concentrations are reported in µg/kg (ppb).

## Sample Number: 0451-96 (Hunters Point/Dry Dock 4 Location #8)

| Analyte | Conc | Reportable Limit | Analyte | Conc | Reportable Limit |
|---|---|---|---|---|---|
| Acetone | ND | 500 | Cis-1,2-Dichloroethene | ND | 100 |
| Benzene | ND | 100 | Trans-1,2-Dichloroethene | ND | 100 |
| Bromodichloromethane | ND | 100 | 1,2-Dichloropropane | ND | 100 |
| Bromoform | ND | 100 | Cis-1,3-Dichloropropene | ND | 100 |
| Bromomethane | ND | 200 | Trans-1,3-Dichloropropene | ND | 100 |
| 2-Butanone | ND | 200 | Ethylbenzene | 1560 | 100 |
| Carbon Disulfide | ND | 100 | 2-Hexanone | ND | 200 |
| Carbon Tetrachloride | ND | 100 | Methylene Chloride | ND | 100 |
| Chlorobenzene | ND | 100 | 4-Methyl-2-Pentanone | ND | 200 |
| Chloroethane | ND | 100 | Styrene | ND | 100 |
| 2-Chloroethyl Vinyl Ether | ND | 100 | 1,1,2,2-Tetrachloroethane | ND | 100 |
| Chloroform | ND | 100 | Tetrachloroethene | ND | 100 |
| Chloromethane | ND | 100 | Toluene | ND | 100 |
| 1,3-Dichlorobenzene | ND | 100 | 1,1,1-Trichloroethane | ND | 100 |
| 1,4-Dichlorobenzene | ND | 100 | 1,1,2-Trichloroethane | ND | 100 |
| 1,2-Dichlorobenzene | ND | 100 | Trichloroethene | ND | 100 |
| Dibromochloromethane | ND | 100 | Trichlorofluoromethane | ND | 100 |
| Dichlorodifluoromethane | ND | 100 | Vinyl Acetate | ND | 100 |
| 1,1-Dichloroethane | ND | 100 | Vinyl Chloride | ND | 100 |
| 1,2-Dichloroethane | ND | 100 | Total Xylenes | 5910 | 200 |
| 1,1-Dichloroethene | ND | 100 | | | |

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# ANALYTICAL REPORT

Mare Island Naval Shipyard
Code 106.14, Stop T-56
Building 1345
Vallejo, CA 94592-5100

Attn: Russ Finlinson
RE: Contract No. N00244-96-D-2009

Date Sampled: 02/27/96
Date Received: 03/01/96
Date Extracted: 03/08/96
Date Analyzed: 03/08/96
Work Order No.: 96-03-001
Method: EPA 8240B


All concentrations are reported in µg/kg (ppb).

## Sample Number: Method Blank

| Analyte | Conc | Reportable Limit | Analyte | Conc | Reportable Limit |
|---|---|---|---|---|---|
| Acetone | ND | 500 | Cis-1,2-Dichloroethene | ND | 100 |
| Benzene | ND | 100 | Trans-1,2-Dichloroethene | ND | 100 |
| Bromodichloromethane | ND | 100 | 1,2-Dichloropropane | ND | 100 |
| Bromoform | ND | 100 | Cis-1,3-Dichloropropene | ND | 100 |
| Bromomethane | ND | 200 | Trans-1,3-Dichloropropene | ND | 100 |
| 2-Butanone | ND | 200 | Ethylbenzene | ND | 100 |
| Carbon Disulfide | ND | 100 | 2-Hexanone | ND | 200 |
| Carbon Tetrachloride | ND | 100 | Methylene Chloride | ND | 100 |
| Chlorobenzene | ND | 100 | 4-Methyl-2-Pentanone | ND | 200 |
| Chloroethane | ND | 100 | Styrene | ND | 100 |
| 2-Chloroethyl Vinyl Ether | ND | 100 | 1,1,2,2-Tetrachloroethane | ND | 100 |
| Chloroform | ND | 100 | Tetrachloroethene | ND | 100 |
| Chloromethane | ND | 100 | Toluene | ND | 100 |
| 1,3-Dichlorobenzene | ND | 100 | 1,1,1-Trichloroethane | ND | 100 |
| 1,4-Dichlorobenzene | ND | 100 | 1,1,2-Trichloroethane | ND | 100 |
| 1,2-Dichlorobenzene | ND | 100 | Trichloroethene | ND | 100 |
| Dibromochloromethane | ND | 100 | Trichlorofluoromethane | ND | 100 |
| Dichlorodifluoromethane | ND | 100 | Vinyl Acetate | ND | 100 |
| 1,1-Dichloroethane | ND | 100 | Vinyl Chloride | ND | 100 |
| 1,2-Dichloroethane | ND | 100 | Total Xylenes | ND | 200 |
| 1,1-Dichloroethene | ND | 100 | | | |

Reviewed and Approved _____ on 03/22/1996
William H. Christensen
Deliverables Manager

ND denotes not detected at indicated reportable limit.

Each sample was received by CEL chilled, intact, and with chain-of-custody attached.

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## ANALYTICAL REPORT

| | | |
|---|---|---|
| Mare Island Naval Shipyard | Date Sampled: | 02/27/96 |
| Code 106.14, Stop T-56 | Date Received: | 03/01/96 |
| Building 1345 | Date Digested: | 03/04/96 |
| Vallejo, CA 94592-5100 | Date Analyzed: | 03/05-12/96 |
| | Work Order No.: | 96-03-001 |
| Attn: Russ Finlinson | | |
| RE: Contract No. N00244-96-D-2009 | Page 1 of 11 | |

All concentrations are reported in mg/kg (ppm). Analyses for Title 22 metals were conducted on a total digestion.

**Sample Number: 0444-96 (Hunters Point/Dry Dock 4 Location #1)**

| Analyte | Method | Concentration | Reportable Limit |
|---|---|---|---|
| Antimony | EPA 6010A | ND | 6.0 |
| Arsenic | EPA 7060A | 7.12 | 0.5 |
| Barium | EPA 6010A | 380 | 10.0 |
| Beryllium | EPA 6010A | ND | 0.6 |
| Cadmium | EPA 6010A | 2.1 | 1.5 |
| Chromium | EPA 6010A | 222 | 2.5 |
| Cobalt | EPA 6010A | 8.2 | 2.5 |
| Copper | EPA 6010A | 4600 | 2.5 |
| Lead | EPA 6010A | 644 | 6.0 |
| Mercury | EPA 7471A | 2.42 | 0.25 |
| Molybdenum | EPA 6010A | 33.7 | 2.5 |
| Nickel | EPA 6010A | 135 | 2.5 |
| Selenium | EPA 7740 | ND | 0.5 |
| Silver | EPA 6010A | ND | 2.5 |
| Thallium | EPA 7841 | ND | 0.5 |
| Vanadium | EPA 6010A | 26.7 | 2.5 |
| Zinc | EPA 6010A | 1450 | 2.5 |

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## ANALYTICAL REPORT

| | | |
|---|---|---|
| Mare Island Naval Shipyard | Date Sampled: | 02/27/96 |
| Code 106.14, Stop T-56 | Date Received: | 03/01/96 |
| Building 1345 | Date Digested: | 03/04/96 |
| Vallejo, CA 94592-5100 | Date Analyzed: | 03/05-12/96 |
| | Work Order No.: | 96-03-001 |
| Attn: Russ Finlinson | | |
| RE: Contract No. N00244-96-D-2009 | Page 2 of 11 | |

All concentrations are reported in mg/kg (ppm). Analyses for Title 22 metals were conducted on a total digestion.

**Sample Number: 0445-96 (Hunters Point/Dry Dock 4 Location #2)**

| Analyte | Method | Concentration | Reportable Limit |
|---|---|---|---|
| Antimony | EPA 6010A | ND | 6.0 |
| Arsenic | EPA 7060A | 17.4 | 0.5 |
| Barium | EPA 6010A | 202 | 10.0 |
| Beryllium | EPA 6010A | ND | 0.6 |
| Cadmium | EPA 6010A | 1.9 | 1.5 |
| Chromium | EPA 6010A | 75 | 2.5 |
| Cobalt | EPA 6010A | 17.6 | 2.5 |
| Copper | EPA 6010A | 1790 | 2.5 |
| Lead | EPA 6010A | 74.1 | 6.0 |
| Mercury | EPA 7471A | ND | 0.25 |
| Molybdenum | EPA 6010A | 64.3 | 2.5 |
| Nickel | EPA 6010A | 38.3 | 2.5 |
| Selenium | EPA 7740 | ND | 0.5 |
| Silver | EPA 6010A | ND | 2.5 |
| Thallium | EPA 7841 | ND | 0.5 |
| Vanadium | EPA 6010A | 30.8 | 2.5 |
| Zinc | EPA 6010A | 830 | 2.5 |

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## ANALYTICAL REPORT

Mare Island Naval Shipyard
Code 106.14, Stop T-56
Building 1345
Vallejo, CA 94592-5100

Attn: Russ Finlinson
RE: Contract No. N00244-96-D-2009

Date Sampled: 02/27/96
Date Received: 03/01/96
Date Digested: 03/04/96
Date Analyzed: 03/05-12/96
Work Order No.: 96-03-001



All concentrations are reported in mg/kg (ppm). Analyses for Title 22 metals were conducted on a total digestion.

**Sample Number: 0446-96 (Hunters Point/Dry Dock 4 Location #3)**

| Analyte | Method | Concentration | Reportable Limit |
|---|---|---|---|
| Antimony | EPA 6010A | ND | 6.0 |
| Arsenic | EPA 7060A | 31.8 | 0.5 |
| Barium | EPA 6010A | 301 | 10.0 |
| Beryllium | EPA 6010A | ND | 0.6 |
| Cadmium | EPA 6010A | 3.6 | 1.5 |
| Chromium | EPA 6010A | 95.9 | 2.5 |
| Cobalt | EPA 6010A | 27.3 | 2.5 |
| Copper | EPA 6010A | 2390 | 2.5 |
| Lead | EPA 6010A | 127 | 6.0 |
| Mercury | EPA 7471A | ND | 0.25 |
| Molybdenum | EPA 6010A | 293 | 2.5 |
| Nickel | EPA 6010A | 80.4 | 2.5 |
| Selenium | EPA 7740 | ND | 0.5 |
| Silver | EPA 6010A | ND | 2.5 |
| Thallium | EPA 7841 | ND | 0.5 |
| Vanadium | EPA 6010A | 33.7 | 2.5 |
| Zinc | EPA 6010A | 748 | 2.5 |

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## ANALYTICAL REPORT

| | | |
|---|---|---|
| Mare Island Naval Shipyard | Date Sampled: | 02/27/96 |
| Code 106.14, Stop T-56 | Date Received: | 03/01/96 |
| Building 1345 | Date Digested: | 03/04/96 |
| Vallejo, CA 94592-5100 | Date Analyzed: | 03/05-12/96 |
| | Work Order No.: | 96-03-001 |
| Attn: Russ Finlinson | | |
| RE: Contract No. N00244-96-D-2009 | Page 4 of 11 | |

All concentrations are reported in mg/kg (ppm). Analyses for Title 22 metals were conducted on a total digestion.

**Sample Number: 0447-96 (Hunters Point/Dry Dock 4 Location #4)**

| Analyte | Method | Concentration | Reportable Limit |
|---|---|---|---|
| Antimony | EPA 6010A | ND | 6.0 |
| Arsenic | EPA 7060A | 8.60 | 0.5 |
| Barium | EPA 6010A | 451 | 10.0 |
| Beryllium | EPA 6010A | ND | 0.6 |
| Cadmium | EPA 6010A | 6.4 | 1.5 |
| Chromium | EPA 6010A | 103 | 2.5 |
| Cobalt | EPA 6010A | 30.0 | 2.5 |
| Copper | EPA 6010A | 3320 | 2.5 |
| Lead | EPA 6010A | 232 | 6.0 |
| Mercury | EPA 7471A | ND | 0.25 |
| Molybdenum | EPA 6010A | 293 | 2.5 |
| Nickel | EPA 6010A | 98.6 | 2.5 |
| Selenium | EPA 7740 | ND | 0.5 |
| Silver | EPA 6010A | ND | 2.5 |
| Thallium | EPA 7841 | ND | 0.5 |
| Vanadium | EPA 6010A | 34.7 | 2.5 |
| Zinc | EPA 6010A | 2560 | 2.5 |

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## ANALYTICAL REPORT

Mare Island Naval Shipyard
Code 106.14, Stop T-56
Building 1345
Vallejo, CA 94592-5100

Attn: Russ Finlinson
RE: Contract No. N00244-96-D-2009

Date Sampled: 02/27/96
Date Received: 03/01/96
Date Digested: 03/04/96
Date Analyzed: 03/05-12/96
Work Order No.: 96-03-001



All concentrations are reported in mg/kg (ppm). Analyses for Title 22 metals were conducted on a total digestion.

**Sample Number: 0448-96 (Hunters Point/Dry Dock 4 Location #5)**

| Analyte | Method | Concentration | Reportable Limit |
|---|---|---|---|
| Antimony | EPA 6010A | ND | 6.0 |
| Arsenic | EPA 7060A | 15.7 | 0.5 |
| Barium | EPA 6010A | 193 | 10.0 |
| Beryllium | EPA 6010A | ND | 0.6 |
| Cadmium | EPA 6010A | 2.0 | 1.5 |
| Chromium | EPA 6010A | 63.4 | 2.5 |
| Cobalt | EPA 6010A | 21.6 | 2.5 |
| Copper | EPA 6010A | 1330 | 2.5 |
| Lead | EPA 6010A | 100 | 6.0 |
| Mercury | EPA 7471A | 0.287 | 0.25 |
| Molybdenum | EPA 6010A | 87.3 | 2.5 |
| Nickel | EPA 6010A | 30.8 | 2.5 |
| Selenium | EPA 7740 | ND | 0.5 |
| Silver | EPA 6010A | ND | 2.5 |
| Thallium | EPA 7841 | ND | 0.5 |
| Vanadium | EPA 6010A | 37.5 | 2.5 |
| Zinc | EPA 6010A | 889 | 2.5 |

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## ANALYTICAL REPORT

| | | |
|---|---|---|
| Mare Island Naval Shipyard | Date Sampled: | 02/27/96 |
| Code 106.14, Stop T-56 | Date Received: | 03/01/96 |
| Building 1345 | Date Digested: | 03/04/96 |
| Vallejo, CA 94592-5100 | Date Analyzed: | 03/05-12/96 |
| | Work Order No.: | 96-03-001 |
| Attn: Russ Finlinson | | |
| RE: Contract No. N00244-96-D-2009 | Page 6 of 11 | |

All concentrations are reported in mg/kg (ppm). Analyses for Title 22 metals were conducted on a total digestion.

**Sample Number: 0449-96 (Hunters Point/Dry Dock 4 Location #6)**

| Analyte | Method | Concentration | Reportable Limit |
|---|---|---|---|
| Antimony | EPA 6010A | ND | 6.0 |
| Arsenic | EPA 7060A | 55.6 | 0.5 |
| Barium | EPA 6010A | 729 | 10.0 |
| Beryllium | EPA 6010A | ND | 0.6 |
| Cadmium | EPA 6010A | 5.0 | 1.5 |
| Chromium | EPA 6010A | 103 | 2.5 |
| Cobalt | EPA 6010A | 33.3 | 2.5 |
| Copper | EPA 6010A | 2550 | 2.5 |
| Lead | EPA 6010A | 268 | 6.0 |
| Mercury | EPA 7471A | ND | 0.25 |
| Molybdenum | EPA 6010A | 721 | 2.5 |
| Nickel | EPA 6010A | 34.0 | 2.5 |
| Selenium | EPA 7740 | ND | 0.5 |
| Silver | EPA 6010A | ND | 2.5 |
| Thallium | EPA 7841 | ND | 0.5 |
| Vanadium | EPA 6010A | 26.0 | 2.5 |
| Zinc | EPA 6010A | 1810 | 2.5 |

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## ANALYTICAL REPORT

| | | |
|---|---|---|
| Mare Island Naval Shipyard | Date Sampled: | 02/27/96 |
| Code 106.14, Stop T-56 | Date Received: | 03/01/96 |
| Building 1345 | Date Digested: | 03/04/96 |
| Vallejo, CA 94592-5100 | Date Analyzed: | 03/05-12/96 |
| | Work Order No.: | 96-03-001 |
| Attn: Russ Finlinson | | |
| RE: Contract No. N00244-96-D-2009 | Page 7 of 11 | |

All concentrations are reported in mg/kg (ppm). Analyses for Title 22 metals were conducted on a total digestion.

**Sample Number: 0450-96 (Hunters Point/Dry Dock 4 Location #7)**

| Analyte | Method | Concentration | Reportable Limit |
|---|---|---|---|
| Antimony | EPA 6010A | ND | 6.0 |
| Arsenic | EPA 7060A | 21.8 | 0.5 |
| Barium | EPA 6010A | 189 | 10.0 |
| Beryllium | EPA 6010A | ND | 0.6 |
| Cadmium | EPA 6010A | ND | 1.5 |
| Chromium | EPA 6010A | 398 | 2.5 |
| Cobalt | EPA 6010A | 13.5 | 2.5 |
| Copper | EPA 6010A | 4180 | 2.5 |
| Lead | EPA 6010A | 330 | 6.0 |
| Mercury | EPA 7471A | 2.77 | 0.25 |
| Molybdenum | EPA 6010A | 171 | 2.5 |
| Nickel | EPA 6010A | 436 | 2.5 |
| Selenium | EPA 7740 | ND | 0.5 |
| Silver | EPA 6010A | ND | 2.5 |
| Thallium | EPA 7841 | ND | 0.5 |
| Vanadium | EPA 6010A | 10.9 | 2.5 |
| Zinc | EPA 6010A | 914 | 2.5 |

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## ANALYTICAL REPORT

| | | |
|---|---|---|
| Mare Island Naval Shipyard | Date Sampled: | 02/27/96 |
| Code 106.14, Stop T-56 | Date Received: | 03/01/96 |
| Building 1345 | Date Digested: | 03/04/96 |
| Vallejo, CA 94592-5100 | Date Analyzed: | 03/05-12/96 |
| | Work Order No.: | 96-03-001 |
| Attn: Russ Finlinson | | |
| RE: Contract No. N00244-96-D-2009 | Page 8 of 11 | |

All concentrations are reported in mg/kg (ppm). Analyses for Title 22 metals were conducted on a total digestion.

**Sample Number: 0451-96 (Hunters Point/Dry Dock 4 Location #8)**

| Analyte | Method | Concentration | Reportable Limit |
|---|---|---|---|
| Antimony | EPA 6010A | ND | 6.0 |
| Arsenic | EPA 7060A | 29.6 | 0.5 |
| Barium | EPA 6010A | 308 | 10.0 |
| Beryllium | EPA 6010A | ND | 0.6 |
| Cadmium | EPA 6010A | 3.3 | 1.5 |
| Chromium | EPA 6010A | 93.0 | 2.5 |
| Cobalt | EPA 6010A | 42.9 | 2.5 |
| Copper | EPA 6010A | 10100 | 2.5 |
| Lead | EPA 6010A | 89.8 | 6.0 |
| Mercury | EPA 7471A | 0.260 | 0.25 |
| Molybdenum | EPA 6010A | 155 | 2.5 |
| Nickel | EPA 6010A | 6870 | 2.5 |
| Selenium | EPA 7740 | ND | 0.5 |
| Silver | EPA 6010A | ND | 2.5 |
| Thallium | EPA 7841 | ND | 0.5 |
| Vanadium | EPA 6010A | 34.6 | 2.5 |
| Zinc | EPA 6010A | 1520 | 2.5 |

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## ANALYTICAL REPORT

| | | |
|---|---|---|
| Mare Island Naval Shipyard | Date Sampled: | 02/27/96 |
| Code 106.14, Stop T-56 | Date Received: | 03/01/96 |
| Building 1345 | Date Digested: | 03/04/96 |
| Vallejo, CA 94592-5100 | Date Analyzed: | 03/05-12/96 |
| | Work Order No.: | 96-03-001 |
| Attn: Russ Finlinson | | |
| RE: Contract No. N00244-96-D-2009 | Page 9 of 11 | |

All concentrations are reported in mg/kg (ppm). Analyses for Title 22 metals were conducted on a total digestion.

**Sample Number: Method Blank**

| Analyte | Method | Concentration | Reportable Limit |
|---|---|---|---|
| Antimony | EPA 6010A | ND | 6.0 |
| Arsenic | EPA 7060A | ND | 0.5 |
| Barium | EPA 6010A | ND | 10.0 |
| Beryllium | EPA 6010A | ND | 0.6 |
| Cadmium | EPA 6010A | ND | 1.5 |
| Chromium | EPA 6010A | ND | 2.5 |
| Cobalt | EPA 6010A | ND | 2.5 |
| Copper | EPA 6010A | ND | 2.5 |
| Lead | EPA 6010A | ND | 6.0 |
| Mercury | EPA 7471A | ND | 0.25 |
| Molybdenum | EPA 6010A | ND | 2.5 |
| Nickel | EPA 6010A | ND | 2.5 |
| Selenium | EPA 7740 | ND | 0.5 |
| Silver | EPA 6010A | ND | 2.5 |
| Thallium | EPA 7841 | ND | 0.5 |
| Vanadium | EPA 6010A | ND | 2.5 |
| Zinc | EPA 6010A | ND | 2.5 |

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## ANALYTICAL REPORT

Mare Island Naval Shipyard
Code 106.14, Stop T-56
Building 1345
Vallejo, CA 94592-5100

Attn: Russ Finlinson
RE: Contract No. N00244-96-D-2009

Date Sampled: 02/27/96
Date Received: 03/01/96
Date Digested: 03/04/96
Date Analyzed: 03/05-07/96
Work Order No.: 96-03-001



All concentrations are reported in mg/kg (ppm). Analyses for Title 22 metals were conducted on a total digestion.

| Analyte | Method | Conc. Added | Conc. Rec. | %REC | Control Limits (%) |
|---|---|---|---|---|---|
| **Sample Number: Laboratory Control Sample** | | | | | |
| Antimony | EPA 6010A | 20.0 | 21.0 | 105 | 80 - 120 |
| Molybdenum | EPA 6010A | 20.0 | 21.2 | 106 | 80 - 120 |
| Nickel | EPA 6010A | 20.0 | 23.4 | 117 | 80 - 120 |
| Silver | EPA 6010A | 10.0 | 10.8 | 108 | 80 - 120 |
| Thallium | EPA 7841 | 0.050 | 0.042 | 84 | 80 - 120 |

**QA/QC**

| Analyte | Method | Sample Conc. | Duplicate Conc. | %RPD | Control Limits (%) |
|---|---|---|---|---|---|
| **Sample Number: 0444-96 (Hunters Point/Dry Dock 4 Location #1) (Duplicate)** | | | | | |
| Mercury | EPA 7471A | 2.41 | 2.71 | 12 | 0 - 20 |
| **Sample Number: 96-02-478-1 (Duplicate)** | | | | | |
| Arsenic | EPA 7060A | 3.71 | 3.86 | 4 | 0 - 20 |
| Selenium | EPA 7740 | ND | ND | NA | 0 - 20 |
| Thallium | EPA 7841 | ND | ND | NA | 0 - 20 |

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## ANALYTICAL REPORT

Mare Island Naval Shipyard
Code 106.14, Stop T-56
Building 1345
Vallejo, CA 94592-5100

Attn: Russ Finlinson
RE: Contract No. N00244-96-D-2009

Date Sampled: 02/27/96
Date Received: 03/01/96
Date Digested: 03/04/96
Date Analyzed: 03/05/96
Work Order No.: 96-03-001



All concentrations are reported in mg/kg (ppm). Analyses for Title 22 metals were conducted on a total digestion.

**QA/QC**

| Analyte | Method | Sample Conc. | Duplicate Conc. | %RPD | Control Limits (%) |
|---|---|---|---|---|---|
| **Sample Number: 96-02-478-1 (Duplicate)** | | | | | |
| Antimony | EPA 6010A | 11.1 | 12.6 | 13 | 0 - 20 |
| Barium | EPA 6010A | 135 | 134 | 1 | 0 - 20 |
| Beryllium | EPA 6010A | ND | ND | NA | 0 - 20 |
| Cadmium | EPA 6010A | 2 | 2.1 | 5 | 0 - 20 |
| Chromium | EPA 6010A | 48.8 | 49.7 | 2 | 0 - 20 |
| Cobalt | EPA 6010A | 12.2 | 12.3 | 1 | 0 - 20 |
| Copper | EPA 6010A | 34.7 | 39.5 | 13 | 0 - 20 |
| Lead | EPA 6010A | 15.4 | 20.6 | 29* | 0 - 20 |
| Molybdenum | EPA 6010A | ND | ND | NA | 0 - 20 |
| Nickel | EPA 6010A | 39.2 | 32.1 | 20 | 0 - 20 |
| Silver | EPA 6010A | ND | ND | NA | 0 - 20 |
| Vanadium | EPA 6010A | 48.8 | 46 | 6 | 0 - 20 |
| Zinc | EPA 6010A | 265 | 268 | 1 | 0 - 20 |

Reviewed and Approved _____ on 03/22/1996
William H. Christensen
Deliverables Manager

* Out of range due to inhomogenous sample.

ND denotes not detected at indicated reportable limit.

Each sample was received by CEL chilled, intact, and with chain-of-custody attached.

Calscience Environmental Laboratories, Inc.

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## ANALYTICAL REPORT

| | | |
|---|---|---|
| Mare Island Naval Shipyard | Date Sampled: | 02/27/96 |
| Code 106.14, Stop T-56 | Date Received: | 03/01/96 |
| Building 1345 | Date Extracted: | 03/05/96 |
| Vallejo, CA 94592-5100 | Date Analyzed: | 03/08/96 |
| | Work Order No.: | 96-03-001 |
| Attn: Russ Finlinson | | |
| RE: Contract No. N00244-96-D-2009 | Page 1 of 2 | |

All concentrations are reported in mg/L (ppm). Analyses for metals were conducted on a WET extract.

| Analyte | Method | Concentration | Reportable Limit |
|---|---|---|---|
| **Sample Number: 0445-96 (Hunters Point/Dry Dock 4 Location #2)** | | | |
| Chromium | EPA 6010A | ND | 5.0 |
| Copper | EPA 6010A | ND | 5.0 |
| Lead | EPA 6010A | ND | 5.0 |
| **Sample Number: 0446-96 (Hunters Point/Dry Dock 4 Location #3)** | | | |
| Chromium | EPA 6010A | ND | 5.0 |
| Copper | EPA 6010A | ND | 5.0 |
| Lead | EPA 6010A | ND | 5.0 |
| **Sample Number: 0448-96 (Hunters Point/Dry Dock 4 Location #5)** | | | |
| Chromium | EPA 6010A | ND | 5.0 |
| Copper | EPA 6010A | ND | 5.0 |
| Lead | EPA 6010A | 5.9 | 5.0 |
| **Sample Number: Method Blank** | | | |
| Chromium | EPA 6010A | ND | 5.0 |
| Copper | EPA 6010A | ND | 5.0 |
| Lead | EPA 6010A | ND | 5.0 |

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## ANALYTICAL REPORT

| | | | |
|---|---|---|---|
| Mare Island Naval Shipyard | | Date Sampled: | 02/27/96 |
| Code 106.14, Stop T-56 | | Date Received: | 03/01/96 |
| Building 1345 | | Date Extracted: | 03/05/96 |
| Vallejo, CA 94592-5100 | | Date Analyzed: | 03/08/96 |
| | | Work Order No.: | 96-03-001 |
| Attn: Russ Finlinson | | | |
| RE: Contract No. N00244-96-D-2009 | | Page 2 of 2 | |

All concentrations are reported in mg/L (ppm). Analyses for metals were conducted on a WET extract.

| Analyte | Method | Conc. Added | Conc. Rec. | %REC | Control Limits (%) |
|---|---|---|---|---|---|
| **Sample Number: Laboratory Control Sample** | | | | | |
| Lead | EPA 6010A | 20.0 | 19.9 | 100 | 80 - 120 |

**QA/QC**

| Analyte | Method | Sample Conc. | Duplicate Conc. | %RPD | Control Limits (%) |
|---|---|---|---|---|---|
| **Sample Number: 0444-96 (Hunters Point/Dry Dock 4 Location #1) (Duplicate)** | | | | | |
| Chromium | EPA 6010A | 9.0 | 8.7 | 3 | 0 - 20 |
| Copper | EPA 6010A | ND | ND | NA | 0 - 20 |
| Lead | EPA 6010A | 17.6 | 16.6 | 6 | 0 - 20 |

Reviewed and Approved _____ on 03/21/1996
William H. Christensen
Deliverables Manager

ND denotes not detected at indicated reportable limit.

Each sample was received by CEL chilled, intact, and with chain-of-custody attached.

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## ANALYTICAL REPORT

| | | |
|---|---|---|
| Mare Island Naval Shipyard | Date Sampled: | 02/27/96 |
| Code 106.14, Stop T-56 | Date Received: | 03/01/96 |
| Building 1345 | Date Extracted: | 03/05/96 |
| Vallejo, CA 94592-5100 | Date Analyzed: | 03/08/96 |
| | Work Order No.: | 96-03-001 |
| Attn: Russ Finlinson | | |
| RE: Contract No. N00244-96-D-2009 | Page 1 of 2 | |

All concentrations are reported in mg/L (ppm). Analyses for metals were conducted on a TCLP extract.

| Analyte | Method | Concentration | Reportable Limit |
|---|---|---|---|
| **Sample Number: 0444-96 (Hunters Point/Dry Dock 4 Location #1)** | | | |
| Chromium | EPA 6010A | ND | 5.0 |
| Lead | EPA 6010A | ND | 5.0 |
| **Sample Number: 0446-96 (Hunters Point/Dry Dock 4 Location #3)** | | | |
| Lead | EPA 6010A | ND | 5.0 |
| **Sample Number: 0447-96 (Hunters Point/Dry Dock 4 Location #4)** | | | |
| Chromium | EPA 6010A | ND | 5.0 |
| Lead | EPA 6010A | ND | 5.0 |
| **Sample Number: 0448-96 (Hunters Point/Dry Dock 4 Location #5)** | | | |
| Lead | EPA 6010A | 5.9 | 5.0 |
| **Sample Number: 0449-96 (Hunters Point/Dry Dock 4 Location #6)** | | | |
| Chromium | EPA 6010A | ND | 5.0 |
| Lead | EPA 6010A | ND | 5.0 |
| **Sample Number: 0450-96 (Hunters Point/Dry Dock 4 Location #7)** | | | |
| Chromium | EPA 6010A | ND | 5.0 |
| Lead | EPA 6010A | ND | 5.0 |

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## ANALYTICAL REPORT

| | | |
|---|---|---|
| Mare Island Naval Shipyard | Date Sampled: | 02/27/96 |
| Code 106.14, Stop T-56 | Date Received: | 03/01/96 |
| Building 1345 | Date Extracted: | 03/05/96 |
| Vallejo, CA 94592-5100 | Date Analyzed: | 03/08/96 |
| | Work Order No.: | 96-03-001 |
| Attn: Russ Finlinson | | |
| RE: Contract No. N00244-96-D-2009 | Page 2 of 2 | |

All concentrations are reported in mg/L (ppm). Analyses for metals were conducted on a TCLP extract.

| Analyte | Method | Concentration | Reportable Limit |
|---|---|---|---|
| **Sample Number: Method Blank** | | | |
| Chromium | EPA 6010A | ND | 5.0 |
| Lead | EPA 6010A | ND | 5.0 |

| Analyte | Method | Conc. Added | Conc. Rec. | %REC | Control Limits (%) |
|---|---|---|---|---|---|
| **Sample Number: Laboratory Control Sample** | | | | | |
| Chromium | EPA 6010A | 20.0 | 19.7 | 99 | 80 - 120 |
| Lead | EPA 6010A | 20.0 | 19.5 | 98 | 80 - 120 |

**QA/QC**

| Analyte | Method | Sample Conc. | Duplicate Conc. | %RPD | Control Limits (%) |
|---|---|---|---|---|---|
| **Sample Number: 0444-96 (Hunters Point/Dry Dock 4 Location #1) (Duplicate)** | | | | | |
| Chromium | EPA 6010A | ND | ND | NA | 0 - 20 |
| Lead | EPA 6010A | ND | ND | NA | 0 - 20 |

Reviewed and Approved _____ on 03/22/1996

William H. Christensen
Deliverables Manager

ND denotes not detected at indicated reportable limit.

Each sample was received by CEL chilled, intact, and with chain-of-custody attached.

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# ANALYTICAL REPORT

| | | | |
|---|---|---|---|
| Mare Island Naval Shipyard | | Date Sampled: | 02/27/96 |
| Code 106.14, Stop T-56 | | Date Received: | 03/01/96 |
| Building 1345 | | Date Extracted: | 03/10/96 |
| Vallejo, CA 94592-5100 | | Date Analyzed: | 03/13/96 |
| | | Work Order No.: | 96-03-001 |
| Attn: Russ Finlinson | | Method: | EPA 8270B |
| RE: Contract No. N00244-96-D-2009 | | Page 1 of 9 | |

Report for sample number 0444-96 (Hunters Point/Dry Dock 4 Location #1). All concentrations are reported in mg/kg (ppm). ND denotes not detected at indicated reportable limit. Each sample was received in a chilled state, intact, and with chain-of-custody attached.

| Analyte | Conc | Reportable Limit | Analyte | Conc | Reportable Limit |
|---|---|---|---|---|---|
| N-Nitrosodimethylamine | ND | 2 | 3-Nitroaniline | ND | 20 |
| Aniline | ND | 2 | Acenaphthene | 3 | 2 |
| Phenol | ND | 2 | 2,4-Dinitrophenol | ND | 20 |
| Bis(2-Chloroethyl) Ether | ND | 2 | 4-Nitrophenol | ND | 20 |
| 2-Chlorophenol | ND | 2 | Dibenzofuran | ND | 2 |
| 1,3-Dichlorobenzene | ND | 2 | 2,4-Dinitrotoluene | ND | 2 |
| 1,4-Dichlorobenzene | ND | 2 | 2,6-Dinitrotoluene | ND | 2 |
| Benzyl Alcohol | ND | 20 | Diethylphthalate | ND | 2 |
| 1,2-Dichlorobenzene | ND | 2 | 4-Chlorophenyl-Phenyl Ether | ND | 2 |
| 2-Methylphenol | ND | 2 | Fluorene | ND | 2 |
| Bis(2-Chloroisopropyl) Ether | ND | 2 | 4-Nitroaniline | ND | 20 |
| 4-Methylphenol | ND | 2 | Azobenzene | ND | 2 |
| N-Nitroso-di-n-propylamine | ND | 20 | 4,6-Dinitro-2-Methylphenol | ND | 20 |
| Hexachloroethane | ND | 2 | N-Nitrosodiphenylamine | ND | 20 |
| Nitrobenzene | ND | 2 | 4-Bromophenyl-Phenyl Ether | ND | 2 |
| Isophorone | ND | 2 | Hexachlorobenzene | ND | 2 |
| 2-Nitrophenol | ND | 2 | Pentachlorophenol | ND | 20 |
| 2,4-Dimethylphenol | ND | 2 | Phenanthrene | 20 | 2 |
| Benzoic Acid | ND | 20 | Anthracene | 6 | 2 |
| Bis(2-Chloroethoxy) Methane | ND | 2 | Di-n-Butylphthalate | ND | 2 |
| 2,4-Dichlorophenol | ND | 2 | Fluoranthene | 51 | 2 |
| 1,2,4-Trichlorobenzene | ND | 2 | Benzidine | ND | 2 |
| Naphthalene | ND | 2 | Pyrene | 35 | 2 |
| 4-Chloroaniline | ND | 2 | Butylbenzylphthalate | ND | 2 |
| Hexachlorobutadiene | ND | 2 | 3,3'-Dichlorobenzidine | ND | 2 |
| 4-Chloro-3-Methylphenol | ND | 2 | Benzo (a) Anthracene | 17 | 2 |
| 2-Methylnaphthalene | ND | 2 | Bis(2-Ethylhexyl) Phthalate | 21 | 2 |
| Hexachlorocyclopentadiene | ND | 2 | Chrysene | 18 | 2 |
| 2,4,6-Trichlorophenol | ND | 2 | Di-n-Octyl Phthalate | ND | 10 |
| 2,4,5-Trichlorophenol | ND | 2 | Benzo (b and k) Fluoranthenes | 14 | 10 |
| 2-Chloronaphthalene | ND | 2 | Benzo (a) Pyrene | 16 | 10 |
| 2-Nitroaniline | ND | 20 | Indeno (1,2,3-cd) Pyrene | ND | 10 |
| Dimethylphthalate | ND | 2 | Dibenzo (a,h) Anthracene | ND | 10 |
| Acenaphthylene | ND | 2 | Benzo (g,h,i) Perylene | ND | 10 |

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## ANALYTICAL REPORT

| | | | |
|---|---|---|---|
| Mare Island Naval Shipyard | | Date Sampled: | 02/27/96 |
| Code 106.14, Stop T-56 | | Date Received: | 03/01/96 |
| Building 1345 | | Date Extracted: | 03/10/96 |
| Vallejo, CA 94592-5100 | | Date Analyzed: | 03/13/96 |
| | | Work Order No.: | 96-03-001 |
| Attn: Russ Finlinson | | Method: | EPA 8270B |
| RE: Contract No. N00244-96-D-2009 | | Page 2 of 9 | |

Report for sample number 0445-96 (Hunters Point/Dry Dock 4 Location #2). All concentrations are reported in mg/kg (ppm). ND denotes not detected at indicated reportable limit. Each sample was received in a chilled state, intact, and with chain-of-custody attached.

| Analyte | Conc | Reportable Limit | Analyte | Conc | Reportable Limit |
|---|---|---|---|---|---|
| N-Nitrosodimethylamine | ND | 0.2 | 3-Nitroaniline | ND | 2 |
| Aniline | ND | 0.2 | Acenaphthene | 0.5 | 0.2 |
| Phenol | ND | 0.2 | 2,4-Dinitrophenol | ND | 2 |
| Bis(2-Chloroethyl) Ether | ND | 0.2 | 4-Nitrophenol | ND | 2 |
| 2-Chlorophenol | ND | 0.2 | Dibenzofuran | 0.3 | 0.2 |
| 1,3-Dichlorobenzene | ND | 0.2 | 2,4-Dinitrotoluene | ND | 0.2 |
| 1,4-Dichlorobenzene | ND | 0.2 | 2,6-Dinitrotoluene | ND | 0.2 |
| Benzyl Alcohol | ND | 2 | Diethylphthalate | ND | 0.2 |
| 1,2-Dichlorobenzene | ND | 0.2 | 4-Chlorophenyl-Phenyl Ether | ND | 0.2 |
| 2-Methylphenol | ND | 0.2 | Fluorene | 0.4 | 0.2 |
| Bis(2-Chloroisopropyl) Ether | ND | 0.2 | 4-Nitroaniline | ND | 2 |
| 4-Methylphenol | ND | 0.2 | Azobenzene | ND | 0.2 |
| N-Nitroso-di-n-propylamine | ND | 2 | 4,6-Dinitro-2-Methylphenol | ND | 2 |
| Hexachloroethane | ND | 0.2 | N-Nitrosodiphenylamine | ND | 2 |
| Nitrobenzene | ND | 0.2 | 4-Bromophenyl-Phenyl Ether | ND | 0.2 |
| Isophorone | ND | 0.2 | Hexachlorobenzene | ND | 0.2 |
| 2-Nitrophenol | ND | 0.2 | Pentachlorophenol | ND | 2 |
| 2,4-Dimethylphenol | ND | 0.2 | Phenanthrene | 2.2 | 0.2 |
| Benzoic Acid | ND | 2 | Anthracene | 0.5 | 0.2 |
| Bis(2-Chloroethoxy) Methane | ND | 0.2 | Di-n-Butylphthalate | ND | 0.2 |
| 2,4-Dichlorophenol | ND | 0.2 | Fluoranthene | 2.8 | 0.2 |
| 1,2,4-Trichlorobenzene | ND | 0.2 | Benzidine | ND | 0.2 |
| Naphthalene | ND | 0.2 | Pyrene | 2.1 | 0.2 |
| 4-Chloroaniline | ND | 0.2 | Butylbenzylphthalate | 0.7 | 0.2 |
| Hexachlorobutadiene | ND | 0.2 | 3,3'-Dichlorobenzidine | ND | 0.2 |
| 4-Chloro-3-Methylphenol | ND | 0.2 | Benzo (a) Anthracene | 1.0 | 0.2 |
| 2-Methylnaphthalene | ND | 0.2 | Bis(2-Ethylhexyl) Phthalate | 2.9 | 0.2 |
| Hexachlorocyclopentadiene | ND | 0.2 | Chrysene | 1.2 | 0.2 |
| 2,4,6-Trichlorophenol | ND | 0.2 | Di-n-Octyl Phthalate | ND | 1.0 |
| 2,4,5-Trichlorophenol | ND | 0.2 | Benzo (b and k) Fluoranthenes | ND | 1.0 |
| 2-Chloronaphthalene | ND | 0.2 | Benzo (a) Pyrene | 1.0 | 1.0 |
| 2-Nitroaniline | ND | 2 | Indeno (1,2,3-cd) Pyrene | ND | 1.0 |
| Dimethylphthalate | ND | 0.2 | Dibenzo (a,h) Anthracene | ND | 1.0 |
| Acenaphthylene | ND | 0.2 | Benzo (g,h,i) Perylene | ND | 1.0 |

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# ANALYTICAL REPORT

Mare Island Naval Shipyard
Code 106.14, Stop T-56
Building 1345
Vallejo, CA 94592-5100

Attn: Russ Finlinson
RE: Contract No. N00244-96-D-2009

Date Sampled: 02/27/96
Date Received: 03/01/96
Date Extracted: 03/10/96
Date Analyzed: 03/13/96
Work Order No.: 96-03-001
Method: EPA 8270B


Report for sample number 0446-96 (Hunters Point/Dry Dock 4 Location #3). All concentrations are reported in mg/kg (ppm). ND denotes not detected at indicated reportable limit. Each sample was received in a chilled state, intact, and with chain-of-custody attached.

| Analyte | Conc | Reportable Limit | Analyte | Conc | Reportable Limit |
|---|---|---|---|---|---|
| N-Nitrosodimethylamine | ND | 0.2 | 3-Nitroaniline | ND | 2 |
| Aniline | ND | 0.2 | Acenaphthene | 0.4 | 0.2 |
| Phenol | ND | 0.2 | 2,4-Dinitrophenol | ND | 2 |
| Bis(2-Chloroethyl) Ether | ND | 0.2 | 4-Nitrophenol | ND | 2 |
| 2-Chlorophenol | ND | 0.2 | Dibenzofuran | 0.2 | 0.2 |
| 1,3-Dichlorobenzene | ND | 0.2 | 2,4-Dinitrotoluene | ND | 0.2 |
| 1,4-Dichlorobenzene | ND | 0.2 | 2,6-Dinitrotoluene | ND | 0.2 |
| Benzyl Alcohol | ND | 2 | Diethylphthalate | ND | 0.2 |
| 1,2-Dichlorobenzene | ND | 0.2 | 4-Chlorophenyl-Phenyl Ether | ND | 0.2 |
| 2-Methylphenol | ND | 0.2 | Fluorene | 0.4 | 0.2 |
| Bis(2-Chloroisopropyl) Ether | ND | 0.2 | 4-Nitroaniline | ND | 2 |
| 4-Methylphenol | ND | 0.2 | Azobenzene | ND | 0.2 |
| N-Nitroso-di-n-propylamine | ND | 2 | 4,6-Dinitro-2-Methylphenol | ND | 2 |
| Hexachloroethane | ND | 0.2 | N-Nitrosodiphenylamine | ND | 2 |
| Nitrobenzene | ND | 0.2 | 4-Bromophenyl-Phenyl Ether | ND | 0.2 |
| Isophorone | ND | 0.2 | Hexachlorobenzene | ND | 0.2 |
| 2-Nitrophenol | ND | 0.2 | Pentachlorophenol | ND | 2 |
| 2,4-Dimethylphenol | ND | 0.2 | Phenanthrene | 2.1 | 0.2 |
| Benzoic Acid | ND | 2 | Anthracene | 0.6 | 0.2 |
| Bis(2-Chloroethoxy) Methane | ND | 0.2 | Di-n-Butylphthalate | ND | 0.2 |
| 2,4-Dichlorophenol | ND | 0.2 | Fluoranthene | 1.9 | 0.2 |
| 1,2,4-Trichlorobenzene | ND | 0.2 | Benzidine | ND | 0.2 |
| Naphthalene | 0.6 | 0.2 | Pyrene | 1.6 | 0.2 |
| 4-Chloroaniline | ND | 0.2 | Butylbenzylphthalate | ND | 0.2 |
| Hexachlorobutadiene | ND | 0.2 | 3,3'-Dichlorobenzidine | ND | 0.2 |
| 4-Chloro-3-Methylphenol | ND | 0.2 | Benzo (a) Anthracene | 0.7 | 0.2 |
| 2-Methylnaphthalene | 2.0 | 0.2 | Bis(2-Ethylhexyl) Phthalate | 3.4 | 0.2 |
| Hexachlorocyclopentadiene | ND | 0.2 | Chrysene | 0.9 | 0.2 |
| 2,4,6-Trichlorophenol | ND | 0.2 | Di-n-Octyl Phthalate | ND | 1.0 |
| 2,4,5-Trichlorophenol | ND | 0.2 | Benzo (b and k) Fluoranthenes | ND | 1.0 |
| 2-Chloronaphthalene | ND | 0.2 | Benzo (a) Pyrene | ND | 1.0 |
| 2-Nitroaniline | ND | 2 | Indeno (1,2,3-cd) Pyrene | ND | 1.0 |
| Dimethylphthalate | 0.5 | 0.2 | Dibenzo (a,h) Anthracene | ND | 1.0 |
| Acenaphthylene | ND | 0.2 | Benzo (g,h,i) Perylene | ND | 1.0 |

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# ANALYTICAL REPORT

Mare Island Naval Shipyard
Code 106.14, Stop T-56
Building 1345
Vallejo, CA 94592-5100

Attn: Russ Finlinson
RE: Contract No. N00244-96-D-2009

Date Sampled: 02/27/96
Date Received: 03/01/96
Date Extracted: 03/10/96
Date Analyzed: 03/13/96
Work Order No.: 96-03-001
Method: EPA 8270B


Report for sample number 0447-96 (Hunters Point/Dry Dock 4 Location #4). All concentrations are reported in mg/kg (ppm). ND denotes not detected at indicated reportable limit. Each sample was received in a chilled state, intact, and with chain-of-custody attached.

| Analyte | Conc | Reportable Limit | Analyte | Conc | Reportable Limit |
|---|---|---|---|---|---|
| N-Nitrosodimethylamine | ND | 0.2 | 3-Nitroaniline | ND | 2 |
| Aniline | ND | 0.2 | Acenaphthene | ND | 0.2 |
| Phenol | ND | 0.2 | 2,4-Dinitrophenol | ND | 2 |
| Bis(2-Chloroethyl) Ether | ND | 0.2 | 4-Nitrophenol | ND | 2 |
| 2-Chlorophenol | ND | 0.2 | Dibenzofuran | ND | 0.2 |
| 1,3-Dichlorobenzene | ND | 0.2 | 2,4-Dinitrotoluene | ND | 0.2 |
| 1,4-Dichlorobenzene | ND | 0.2 | 2,6-Dinitrotoluene | ND | 0.2 |
| Benzyl Alcohol | ND | 2 | Diethylphthalate | ND | 0.2 |
| 1,2-Dichlorobenzene | ND | 0.2 | 4-Chlorophenyl-Phenyl Ether | ND | 0.2 |
| 2-Methylphenol | ND | 0.2 | Fluorene | ND | 0.2 |
| Bis(2-Chloroisopropyl) Ether | ND | 0.2 | 4-Nitroaniline | ND | 2 |
| 4-Methylphenol | ND | 0.2 | Azobenzene | ND | 0.2 |
| N-Nitroso-di-n-propylamine | ND | 2 | 4,6-Dinitro-2-Methylphenol | ND | 2 |
| Hexachloroethane | ND | 0.2 | N-Nitrosodiphenylamine | ND | 2 |
| Nitrobenzene | ND | 0.2 | 4-Bromophenyl-Phenyl Ether | ND | 0.2 |
| Isophorone | ND | 0.2 | Hexachlorobenzene | ND | 0.2 |
| 2-Nitrophenol | ND | 0.2 | Pentachlorophenol | ND | 2 |
| 2,4-Dimethylphenol | ND | 0.2 | Phenanthrene | 1.2 | 0.2 |
| Benzoic Acid | ND | 2 | Anthracene | ND | 0.2 |
| Bis(2-Chloroethoxy) Methane | ND | 0.2 | Di-n-Butylphthalate | ND | 0.2 |
| 2,4-Dichlorophenol | ND | 0.2 | Fluoranthene | 1.0 | 0.2 |
| 1,2,4-Trichlorobenzene | ND | 0.2 | Benzidine | ND | 0.2 |
| Naphthalene | 0.7 | 0.2 | Pyrene | 0.8 | 0.2 |
| 4-Chloroaniline | ND | 0.2 | Butylbenzylphthalate | 1.4 | 0.2 |
| Hexachlorobutadiene | ND | 0.2 | 3,3'-Dichlorobenzidine | ND | 0.2 |
| 4-Chloro-3-Methylphenol | ND | 0.2 | Benzo (a) Anthracene | 0.4 | 0.2 |
| 2-Methylnaphthalene | ND | 0.2 | Bis(2-Ethylhexyl) Phthalate | 3.4 | 0.2 |
| Hexachlorocyclopentadiene | ND | 0.2 | Chrysene | 0.5 | 0.2 |
| 2,4,6-Trichlorophenol | ND | 0.2 | Di-n-Octyl Phthalate | ND | 1.0 |
| 2,4,5-Trichlorophenol | ND | 0.2 | Benzo (b and k) Fluoranthenes | ND | 1.0 |
| 2-Chloronaphthalene | ND | 0.2 | Benzo (a) Pyrene | ND | 1.0 |
| 2-Nitroaniline | ND | 2 | Indeno (1,2,3-cd) Pyrene | ND | 1.0 |
| Dimethylphthalate | ND | 0.2 | Dibenzo (a,h) Anthracene | ND | 1.0 |
| Acenaphthylene | ND | 0.2 | Benzo (g,h,i) Perylene | ND | 1.0 |

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# ANALYTICAL REPORT

Mare Island Naval Shipyard
Code 106.14, Stop T-56
Building 1345
Vallejo, CA 94592-5100

Attn: Russ Finlinson
RE: Contract No. N00244-96-D-2009

Date Sampled: 02/27/96
Date Received: 03/01/96
Date Extracted: 03/10/96
Date Analyzed: 03/13/96
Work Order No.: 96-03-001
Method: EPA 8270B


Report for sample number 0448-96 (Hunters Point/Dry Dock 4 Location #5). All concentrations are reported in mg/kg (ppm). ND denotes not detected at indicated reportable limit. Each sample was received in a chilled state, intact, and with chain-of-custody attached.

| Analyte | Conc | Reportable Limit | Analyte | Conc | Reportable Limit |
|---|---|---|---|---|---|
| N-Nitrosodimethylamine | ND | 0.2 | 3-Nitroaniline | ND | 2 |
| Aniline | ND | 0.2 | Acenaphthene | 0.4 | 0.2 |
| Phenol | ND | 0.2 | 2,4-Dinitrophenol | ND | 2 |
| Bis(2-Chloroethyl) Ether | ND | 0.2 | 4-Nitrophenol | ND | 2 |
| 2-Chlorophenol | ND | 0.2 | Dibenzofuran | 0.2 | 0.2 |
| 1,3-Dichlorobenzene | ND | 0.2 | 2,4-Dinitrotoluene | ND | 0.2 |
| 1,4-Dichlorobenzene | ND | 0.2 | 2,6-Dinitrotoluene | ND | 0.2 |
| Benzyl Alcohol | ND | 2 | Diethylphthalate | ND | 0.2 |
| 1,2-Dichlorobenzene | ND | 0.2 | 4-Chlorophenyl-Phenyl Ether | ND | 0.2 |
| 2-Methylphenol | ND | 0.2 | Fluorene | 0.4 | 0.2 |
| Bis(2-Chloroisopropyl) Ether | ND | 0.2 | 4-Nitroaniline | ND | 2 |
| 4-Methylphenol | ND | 0.2 | Azobenzene | ND | 0.2 |
| N-Nitroso-di-n-propylamine | ND | 2 | 4,6-Dinitro-2-Methylphenol | ND | 2 |
| Hexachloroethane | ND | 0.2 | N-Nitrosodiphenylamine | ND | 2 |
| Nitrobenzene | ND | 0.2 | 4-Bromophenyl-Phenyl Ether | ND | 0.2 |
| Isophorone | ND | 0.2 | Hexachlorobenzene | ND | 0.2 |
| 2-Nitrophenol | ND | 0.2 | Pentachlorophenol | ND | 2 |
| 2,4-Dimethylphenol | ND | 0.2 | Phenanthrene | 2.2 | 0.2 |
| Benzoic Acid | ND | 2 | Anthracene | 0.5 | 0.2 |
| Bis(2-Chloroethoxy) Methane | ND | 0.2 | Di-n-Butylphthalate | ND | 0.2 |
| 2,4-Dichlorophenol | ND | 0.2 | Fluoranthene | 2.0 | 0.2 |
| 1,2,4-Trichlorobenzene | ND | 0.2 | Benzidine | ND | 0.2 |
| Naphthalene | 0.6 | 0.2 | Pyrene | 1.6 | 0.2 |
| 4-Chloroaniline | ND | 0.2 | Butylbenzylphthalate | 0.3 | 0.2 |
| Hexachlorobutadiene | ND | 0.2 | 3,3'-Dichlorobenzidine | ND | 0.2 |
| 4-Chloro-3-Methylphenol | ND | 0.2 | Benzo (a) Anthracene | 0.7 | 0.2 |
| 2-Methylnaphthalene | ND | 0.2 | Bis(2-Ethylhexyl) Phthalate | 12.4 | 0.2 |
| Hexachlorocyclopentadiene | ND | 0.2 | Chrysene | 0.9 | 0.2 |
| 2,4,6-Trichlorophenol | ND | 0.2 | Di-n-Octyl Phthalate | ND | 1.0 |
| 2,4,5-Trichlorophenol | ND | 0.2 | Benzo (b and k) Fluoranthenes | ND | 1.0 |
| 2-Chloronaphthalene | ND | 0.2 | Benzo (a) Pyrene | ND | 1.0 |
| 2-Nitroaniline | ND | 2 | Indeno (1,2,3-cd) Pyrene | ND | 1.0 |
| Dimethylphthalate | ND | 0.2 | Dibenzo (a,h) Anthracene | ND | 1.0 |
| Acenaphthylene | ND | 0.2 | Benzo (g,h,i) Perylene | ND | 1.0 |

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# ANALYTICAL REPORT

Mare Island Naval Shipyard
Code 106.14, Stop T-56
Building 1345
Vallejo, CA 94592-5100

Attn: Russ Finlinson
RE: Contract No. N00244-96-D-2009

Date Sampled: 02/27/96
Date Received: 03/01/96
Date Extracted: 03/10/96
Date Analyzed: 03/13/96
Work Order No.: 96-03-001
Method: EPA 8270B


Report for sample number 0449-96 (Hunters Point/Dry Dock 4 Location #6). All concentrations are reported in mg/kg (ppm). ND denotes not detected at indicated reportable limit. Each sample was received in a chilled state, intact, and with chain-of-custody attached.

| Analyte | Conc | Reportable Limit | Analyte | Conc | Reportable Limit |
|---|---|---|---|---|---|
| N-Nitrosodimethylamine | ND | 0.2 | 3-Nitroaniline | ND | 2 |
| Aniline | ND | 0.2 | Acenaphthene | 0.4 | 0.2 |
| Phenol | ND | 0.2 | 2,4-Dinitrophenol | ND | 2 |
| Bis(2-Chloroethyl) Ether | ND | 0.2 | 4-Nitrophenol | ND | 2 |
| 2-Chlorophenol | ND | 0.2 | Dibenzofuran | 0.2 | 0.2 |
| 1,3-Dichlorobenzene | ND | 0.2 | 2,4-Dinitrotoluene | ND | 0.2 |
| 1,4-Dichlorobenzene | ND | 0.2 | 2,6-Dinitrotoluene | ND | 0.2 |
| Benzyl Alcohol | ND | 2 | Diethylphthalate | 0.3 | 0.2 |
| 1,2-Dichlorobenzene | ND | 0.2 | 4-Chlorophenyl-Phenyl Ether | ND | 0.2 |
| 2-Methylphenol | ND | 0.2 | Fluorene | 0.5 | 0.2 |
| Bis(2-Chloroisopropyl) Ether | ND | 0.2 | 4-Nitroaniline | ND | 2 |
| 4-Methylphenol | ND | 0.2 | Azobenzene | ND | 0.2 |
| N-Nitroso-di-n-propylamine | ND | 2 | 4,6-Dinitro-2-Methylphenol | ND | 2 |
| Hexachloroethane | ND | 0.2 | N-Nitrosodiphenylamine | ND | 2 |
| Nitrobenzene | ND | 0.2 | 4-Bromophenyl-Phenyl Ether | ND | 0.2 |
| Isophorone | ND | 0.2 | Hexachlorobenzene | ND | 0.2 |
| 2-Nitrophenol | ND | 0.2 | Pentachlorophenol | ND | 2 |
| 2,4-Dimethylphenol | ND | 0.2 | Phenanthrene | 3.7 | 0.2 |
| Benzoic Acid | ND | 2 | Anthracene | 0.8 | 0.2 |
| Bis(2-Chloroethoxy) Methane | ND | 0.2 | Di-n-Butylphthalate | ND | 0.2 |
| 2,4-Dichlorophenol | ND | 0.2 | Fluoranthene | 3.6 | 0.2 |
| 1,2,4-Trichlorobenzene | ND | 0.2 | Benzidine | ND | 0.2 |
| Naphthalene | 1.2 | 0.2 | Pyrene | 3.5 | 0.2 |
| 4-Chloroaniline | ND | 0.2 | Butylbenzylphthalate | 0.4 | 0.2 |
| Hexachlorobutadiene | ND | 0.2 | 3,3'-Dichlorobenzidine | ND | 0.2 |
| 4-Chloro-3-Methylphenol | ND | 0.2 | Benzo (a) Anthracene | 1.7 | 0.2 |
| 2-Methylnaphthalene | 0.4 | 0.2 | Bis(2-Ethylhexyl) Phthalate | 5.5 | 0.2 |
| Hexachlorocyclopentadiene | ND | 0.2 | Chrysene | 2.0 | 0.2 |
| 2,4,6-Trichlorophenol | ND | 0.2 | Di-n-Octyl Phthalate | ND | 1.0 |
| 2,4,5-Trichlorophenol | ND | 0.2 | Benzo (b and k) Fluoranthenes | 1.6 | 1.0 |
| 2-Chloronaphthalene | ND | 0.2 | Benzo (a) Pyrene | 1.7 | 1.0 |
| 2-Nitroaniline | ND | 2 | Indeno (1,2,3-cd) Pyrene | ND | 1.0 |
| Dimethylphthalate | ND | 0.2 | Dibenzo (a,h) Anthracene | ND | 1.0 |
| Acenaphthylene | ND | 0.2 | Benzo (g,h,i) Perylene | ND | 1.0 |

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# ANALYTICAL REPORT

Mare Island Naval Shipyard
Code 106.14, Stop T-56
Building 1345
Vallejo, CA 94592-5100

Attn: Russ Finlinson
RE: Contract No. N00244-96-D-2009

Date Sampled: 02/27/96
Date Received: 03/01/96
Date Extracted: 03/10/96
Date Analyzed: 03/13/96
Work Order No.: 96-03-001
Method: EPA 8270B


Report for sample number 0450-96 (Hunters Point/Dry Dock 4 Location #7). All concentrations are reported in mg/kg (ppm). ND denotes not detected at indicated reportable limit. Each sample was received in a chilled state, intact, and with chain-of-custody attached.

| Analyte | Conc | Reportable Limit | Analyte | Conc | Reportable Limit |
|---|---|---|---|---|---|
| N-Nitrosodimethylamine | ND | 0.2 | 3-Nitroaniline | ND | 2 |
| Aniline | ND | 0.2 | Acenaphthene | ND | 0.2 |
| Phenol | ND | 0.2 | 2,4-Dinitrophenol | ND | 2 |
| Bis(2-Chloroethyl) Ether | ND | 0.2 | 4-Nitrophenol | ND | 2 |
| 2-Chlorophenol | ND | 0.2 | Dibenzofuran | ND | 0.2 |
| 1,3-Dichlorobenzene | ND | 0.2 | 2,4-Dinitrotoluene | ND | 0.2 |
| 1,4-Dichlorobenzene | ND | 0.2 | 2,6-Dinitrotoluene | ND | 0.2 |
| Benzyl Alcohol | ND | 2 | Diethylphthalate | ND | 0.2 |
| 1,2-Dichlorobenzene | ND | 0.2 | 4-Chlorophenyl-Phenyl Ether | ND | 0.2 |
| 2-Methylphenol | ND | 0.2 | Fluorene | ND | 0.2 |
| Bis(2-Chloroisopropyl) Ether | ND | 0.2 | 4-Nitroaniline | ND | 2 |
| 4-Methylphenol | ND | 0.2 | Azobenzene | ND | 0.2 |
| N-Nitroso-di-n-propylamine | ND | 2 | 4,6-Dinitro-2-Methylphenol | ND | 2 |
| Hexachloroethane | ND | 0.2 | N-Nitrosodiphenylamine | ND | 2 |
| Nitrobenzene | ND | 0.2 | 4-Bromophenyl-Phenyl Ether | ND | 0.2 |
| Isophorone | ND | 0.2 | Hexachlorobenzene | ND | 0.2 |
| 2-Nitrophenol | ND | 0.2 | Pentachlorophenol | ND | 2 |
| 2,4-Dimethylphenol | ND | 0.2 | Phenanthrene | 0.8 | 0.2 |
| Benzoic Acid | ND | 2 | Anthracene | ND | 0.2 |
| Bis(2-Chloroethoxy) Methane | ND | 0.2 | Di-n-Butylphthalate | ND | 0.2 |
| 2,4-Dichlorophenol | ND | 0.2 | Fluoranthene | 1.0 | 0.2 |
| 1,2,4-Trichlorobenzene | ND | 0.2 | Benzidine | ND | 0.2 |
| Naphthalene | 0.3 | 0.2 | Pyrene | 1.3 | 0.2 |
| 4-Chloroaniline | ND | 0.2 | Butylbenzylphthalate | ND | 0.2 |
| Hexachlorobutadiene | ND | 0.2 | 3,3'-Dichlorobenzidine | ND | 0.2 |
| 4-Chloro-3-Methylphenol | ND | 0.2 | Benzo (a) Anthracene | 0.4 | 0.2 |
| 2-Methylnaphthalene | ND | 0.2 | Bis(2-Ethylhexyl) Phthalate | 10.7 | 0.2 |
| Hexachlorocyclopentadiene | ND | 0.2 | Chrysene | 0.4 | 0.2 |
| 2,4,6-Trichlorophenol | ND | 0.2 | Di-n-Octyl Phthalate | ND | 1.0 |
| 2,4,5-Trichlorophenol | ND | 0.2 | Benzo (b and k) Fluoranthenes | ND | 1.0 |
| 2-Chloronaphthalene | ND | 0.2 | Benzo (a) Pyrene | ND | 1.0 |
| 2-Nitroaniline | ND | 2 | Indeno (1,2,3-cd) Pyrene | ND | 1.0 |
| Dimethylphthalate | ND | 0.2 | Dibenzo (a,h) Anthracene | ND | 1.0 |
| Acenaphthylene | ND | 0.2 | Benzo (g,h,i) Perylene | ND | 1.0 |

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# ANALYTICAL REPORT

Mare Island Naval Shipyard
Code 106.14, Stop T-56
Building 1345
Vallejo, CA 94592-5100

Attn: Russ Finlinson
RE: Contract No. N00244-96-D-2009

Date Sampled: 02/27/96
Date Received: 03/01/96
Date Extracted: 03/10/96
Date Analyzed: 03/13/96
Work Order No.: 96-03-001
Method: EPA 8270B


Report for sample number 0451-96 (Hunters Point/Dry Dock 4 Location #8). All concentrations are reported in mg/kg (ppm). ND denotes not detected at indicated reportable limit. Each sample was received in a chilled state, intact, and with chain-of-custody attached.

| Analyte | Conc | Reportable Limit | Analyte | Conc | Reportable Limit |
|---|---|---|---|---|---|
| N-Nitrosodimethylamine | ND | 0.2 | 3-Nitroaniline | ND | 2 |
| Aniline | ND | 0.2 | Acenaphthene | 0.2 | 0.2 |
| Phenol | ND | 0.2 | 2,4-Dinitrophenol | ND | 2 |
| Bis(2-Chloroethyl) Ether | ND | 0.2 | 4-Nitrophenol | ND | 2 |
| 2-Chlorophenol | ND | 0.2 | Dibenzofuran | ND | 0.2 |
| 1,3-Dichlorobenzene | ND | 0.2 | 2,4-Dinitrotoluene | ND | 0.2 |
| 1,4-Dichlorobenzene | ND | 0.2 | 2,6-Dinitrotoluene | ND | 0.2 |
| Benzyl Alcohol | ND | 2 | Diethylphthalate | ND | 0.2 |
| 1,2-Dichlorobenzene | ND | 0.2 | 4-Chlorophenyl-Phenyl Ether | ND | 0.2 |
| 2-Methylphenol | ND | 0.2 | Fluorene | 0.3 | 0.2 |
| Bis(2-Chloroisopropyl) Ether | ND | 0.2 | 4-Nitroaniline | ND | 2 |
| 4-Methylphenol | 0.4 | 0.2 | Azobenzene | ND | 0.2 |
| N-Nitroso-di-n-propylamine | ND | 2 | 4,6-Dinitro-2-Methylphenol | ND | 2 |
| Hexachloroethane | ND | 0.2 | N-Nitrosodiphenylamine | ND | 2 |
| Nitrobenzene | ND | 0.2 | 4-Bromophenyl-Phenyl Ether | ND | 0.2 |
| Isophorone | ND | 0.2 | Hexachlorobenzene | ND | 0.2 |
| 2-Nitrophenol | ND | 0.2 | Pentachlorophenol | ND | 2 |
| 2,4-Dimethylphenol | ND | 0.2 | Phenanthrene | 2.1 | 0.2 |
| Benzoic Acid | ND | 2 | Anthracene | 0.4 | 0.2 |
| Bis(2-Chloroethoxy) Methane | ND | 0.2 | Di-n-Butylphthalate | ND | 0.2 |
| 2,4-Dichlorophenol | ND | 0.2 | Fluoranthene | 2.0 | 0.2 |
| 1,2,4-Trichlorobenzene | ND | 0.2 | Benzidine | ND | 0.2 |
| Naphthalene | 0.5 | 0.2 | Pyrene | 1.8 | 0.2 |
| 4-Chloroaniline | ND | 0.2 | Butylbenzylphthalate | 0.8 | 0.2 |
| Hexachlorobutadiene | ND | 0.2 | 3,3'-Dichlorobenzidine | ND | 0.2 |
| 4-Chloro-3-Methylphenol | ND | 0.2 | Benzo (a) Anthracene | 0.7 | 0.2 |
| 2-Methylnaphthalene | 0.2 | 0.2 | Bis(2-Ethylhexyl) Phthalate | 2.0 | 0.2 |
| Hexachlorocyclopentadiene | ND | 0.2 | Chrysene | 0.9 | 0.2 |
| 2,4,6-Trichlorophenol | ND | 0.2 | Di-n-Octyl Phthalate | ND | 1.0 |
| 2,4,5-Trichlorophenol | ND | 0.2 | Benzo (b and k) Fluoranthenes | ND | 1.0 |
| 2-Chloronaphthalene | ND | 0.2 | Benzo (a) Pyrene | ND | 1.0 |
| 2-Nitroaniline | ND | 2 | Indeno (1,2,3-cd) Pyrene | ND | 1.0 |
| Dimethylphthalate | ND | 0.2 | Dibenzo (a,h) Anthracene | ND | 1.0 |
| Acenaphthylene | ND | 0.2 | Benzo (g,h,i) Perylene | ND | 1.0 |

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# ANALYTICAL REPORT

| | | | |
|---|---|---|---|
| Mare Island Naval Shipyard | | Date Sampled: | 02/27/96 |
| Code 106.14, Stop T-56 | | Date Received: | 03/01/96 |
| Building 1345 | | Date Extracted: | 03/10/96 |
| Vallejo, CA 94592-5100 | | Date Analyzed: | 03/12/96 |
| | | Work Order No.: | 96-03-001 |
| Attn: Russ Finlinson | | Method: | EPA 8270B |
| RE: Contract No. N00244-96-D-2009 | | Page 9 of 9 | |

Report for sample number Method Blank. All concentrations are reported in mg/kg (ppm). ND denotes not detected at indicated reportable limit. Each sample was received in a chilled state, intact, and with chain-of-custody attached.

| Analyte | Conc | Reportable Limit | Analyte | Conc | Reportable Limit |
|---|---|---|---|---|---|
| N-Nitrosodimethylamine | ND | 0.2 | 3-Nitroaniline | ND | 2 |
| Aniline | ND | 0.2 | Acenaphthene | ND | 0.2 |
| Phenol | ND | 0.2 | 2,4-Dinitrophenol | ND | 2 |
| Bis(2-Chloroethyl) Ether | ND | 0.2 | 4-Nitrophenol | ND | 2 |
| 2-Chlorophenol | ND | 0.2 | Dibenzofuran | ND | 0.2 |
| 1,3-Dichlorobenzene | ND | 0.2 | 2,4-Dinitrotoluene | ND | 0.2 |
| 1,4-Dichlorobenzene | ND | 0.2 | 2,6-Dinitrotoluene | ND | 0.2 |
| Benzyl Alcohol | ND | 2 | Diethylphthalate | ND | 0.2 |
| 1,2-Dichlorobenzene | ND | 0.2 | 4-Chlorophenyl-Phenyl Ether | ND | 0.2 |
| 2-Methylphenol | ND | 0.2 | Fluorene | ND | 0.2 |
| Bis(2-Chloroisopropyl) Ether | ND | 0.2 | 4-Nitroaniline | ND | 2 |
| 4-Methylphenol | ND | 0.2 | Azobenzene | ND | 0.2 |
| N-Nitroso-di-n-propylamine | ND | 2 | 4,6-Dinitro-2-Methylphenol | ND | 2 |
| Hexachloroethane | ND | 0.2 | N-Nitrosodiphenylamine | ND | 2 |
| Nitrobenzene | ND | 0.2 | 4-Bromophenyl-Phenyl Ether | ND | 0.2 |
| Isophorone | ND | 0.2 | Hexachlorobenzene | ND | 0.2 |
| 2-Nitrophenol | ND | 0.2 | Pentachlorophenol | ND | 2 |
| 2,4-Dimethylphenol | ND | 0.2 | Phenanthrene | ND | 0.2 |
| Benzoic Acid | ND | 2 | Anthracene | ND | 0.2 |
| Bis(2-Chloroethoxy) Methane | ND | 0.2 | Di-n-Butylphthalate | 17.8 | 0.2 |
| 2,4-Dichlorophenol | ND | 0.2 | Fluoranthene | ND | 0.2 |
| 1,2,4-Trichlorobenzene | ND | 0.2 | Benzidine | ND | 0.2 |
| Naphthalene | ND | 0.2 | Pyrene | ND | 0.2 |
| 4-Chloroaniline | ND | 0.2 | Butylbenzylphthalate | ND | 0.2 |
| Hexachlorobutadiene | ND | 0.2 | 3,3'-Dichlorobenzidine | ND | 0.2 |
| 4-Chloro-3-Methylphenol | ND | 0.2 | Benzo (a) Anthracene | ND | 0.2 |
| 2-Methylnaphthalene | ND | 0.2 | Bis(2-Ethylhexyl) Phthalate | ND | 0.2 |
| Hexachlorocyclopentadiene | ND | 0.2 | Chrysene | ND | 0.2 |
| 2,4,6-Trichlorophenol | ND | 0.2 | Di-n-Octyl Phthalate | ND | 1.0 |
| 2,4,5-Trichlorophenol | ND | 0.2 | Benzo (b and k) Fluoranthenes | ND | 1.0 |
| 2-Chloronaphthalene | ND | 0.2 | Benzo (a) Pyrene | ND | 1.0 |
| 2-Nitroaniline | ND | 2 | Indeno (1,2,3-cd) Pyrene | ND | 1.0 |
| Dimethylphthalate | ND | 0.2 | Dibenzo (a,h) Anthracene | ND | 1.0 |
| Acenaphthylene | ND | 0.2 | Benzo (g,h,i) Perylene | ND | 1.0 |

Reviewed and Approved _____ on 03/22/1996

William H. Christensen
Deliverables Manager

Calscience Environmental Laboratories, Inc.

ACCREDITED

# QUALITY ASSURANCE SUMMARY

Method EPA 8270B

Mare Island Naval Shipyard — Work Order No.: 96-03-001
Page 1 of 1 — Date Analyzed: 03/13/96

## Matrix Spike/Matrix Spike Duplicate

Sample Spiked: 96-03-056-1

| Analyte | MS%REC | MSD%REC | Control Limits | %RPD | Control Limits |
|---|---|---|---|---|---|
| Phenol | 71 | 70 | 20 - 120 | 0 | 0 - 42 |
| 2-Chlorophenol | 67 | 67 | 23 - 134 | 0 | 0 - 40 |
| 1,4-Dichlorobenzene | 67 | 62 | 20 - 124 | 7 | 0 - 28 |
| N-Nitroso-di-n-propylamine | 87 | 85 | D - 230 | 1 | 0 - 38 |
| 1,2,4-Trichlorobenzene | 68 | 66 | 44 - 142 | 3 | 0 - 28 |
| Acenaphthene | 70 | 68 | 47 - 145 | 3 | 0 - 31 |
| 2,4-Dinitrotoluene | 58 | 58 | 39 - 139 | 1 | 0 - 38 |

## Surrogate Recoveries (in %)

| Sample Number | S1 | S2 | S3 | S4 | S5 | S6 |
|---|---|---|---|---|---|---|
| 0444-96 | 90 | 86 | 82 | 98 | 111 | 94 |
| 0445-96 | 81 | 89 | 79 | 73 | 76 | 72 |
| 0446-96 | 92 | 101 | 86 | 93 | 88 | 81 |
| 0447-96 | 86 | 99 | 84 | 59 | 83 | 79 |
| 0448-96 | 73 | 85 | 74 | 57 | 74 | 68 |
| 0449-96 | 78 | 90 | 81 | 62 | 81 | 79 |
| 0450-96 | 87 | 97 | 85 | 89 | 83 | 94 |
| 0451-96 | 80 | 91 | 80 | 80 | 81 | 80 |
| Method Blank | 78 | 86 | 73 | 83 | 73 | 64 |

| Surrogate Compound | Water %REC Acceptable Limits | Soil %REC Acceptable Limits |
|---|---|---|
| S1 > 2-Fluorophenol | 21 - 100 | 25 - 121 |
| S2 > Phenol-$d_6$ | 10 - 94 | 24 - 113 |
| S3 > Nitrobenzene-$d_5$ | 35 - 114 | 23 - 120 |
| S4 > 2-Fluorobiphenyl | 43 - 116 | 30 - 115 |
| S5 > 2,4,6-Tribromophenol | 10 - 123 | 19 - 122 |
| S6 > p-Terphenyl-d14 | 33 - 141 | 18 - 137 |

Reviewed and approved: _____ on 03/22/1996

William H. Christensen
Deliverables Manager

7440 Lincoln Way, Garden Grove, CA 92641-1432 • TEL: (714) 895-5494 • FAX: (714) 894-7501

Calscience Environmental Laboratories, Inc.

ACCREDITED

# QUALITY ASSURANCE SUMMARY

Method EPA 8240B

Mare Island Naval Shipyard — Work Order No.: 96-03-001
Page 1 of 1 — Date Analyzed: 03/08/96

## Blank Spike/Blank Spike Duplicate

Sample Spiked: Method Blank

| Analyte | BS%REC | BSD%REC | Control Limits | %RPD | Control Limits |
|---|---|---|---|---|---|
| Benzene | 102 | 99 | 37 - 151 | 3 | 0 - 25 |
| Chlorobenzene | 100 | 100 | 37 - 160 | 0 | 0 - 25 |
| Toluene | 100 | 100 | 47 - 150 | 0 | 0 - 25 |
| 1,1-Dichloroethene | 99 | 103 | D - 234 | 4 | 0 - 25 |
| Trichloroethene | 104 | 99 | 71 - 157 | 5 | 0 - 25 |

## Surrogate Recoveries (in %)

| Sample Number | S1 | S2 | S3 |
|---|---|---|---|
| 0444-96 | 108 | 107 | 98 |
| 0445-96 | 113 | 101 | 93 |
| 0446-96 | 109 | 114 | 89 |
| 0447-96 | 94 | 99 | 99 |
| 0448-96 | 106 | 116 | 89 |
| 0449-96 | 114 | 111 | 87 |
| 0450-96 | 111 | 111 | 87 |
| 0451-96 | 107 | 112 | 85 |
| Method Blank | 108 | 105 | 94 |

| Surrogate Compound | Water %REC Acceptable Limits | Soil %REC Acceptable Limits |
|---|---|---|
| S1 > 1,2-Dichloroethane-d4 | 76 - 114 | 70 - 121 |
| S2 > Toluene-d8 | 88 - 110 | 81 - 117 |
| S3 > 1,4-Bromofluorobenzene | 86 - 115 | 74 - 121 |

Reviewed and approved: _____ on 03/22/1996

William H. Christensen
Deliverables Manager

7440 Lincoln Way, Garden Grove, CA 92641-1432 • TEL: (714) 895-5494 • FAX: (714) 894-7501

# COST ESTIMATE FOR ALTERNATE #1

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL

| | | | |
|---|---|---|---|
| To W. STORMS | # of pages ▸ 4 | | |
| Dept./Agency | From D. TIEDJE | | |
| Fax # | Phone # 302 5598 | | |
| NSN 7540-01-317-7368 | 5099-101 | Fax # | GENERAL SERVICES ADMINISTRATION |

DRY DOCK 4
TUNNEL SEALING SCOPE

1. INSTALL OUTFALL FORMWORK
2. PUMP CONCRETE THROUGH DRAIN OPENINGS
3. HYDROBLAST COLLECTION TRENCH
4. INSTALL TRENCH DOWELS
5. FILL AND SCREED TRENCH
6. CURING

THE SEALING OF THE TUNNELS SHALL PROCEED FROM THE OUTFALL AND CONTINUE TO THE END OF THE TUNNEL.

THE PROGRESS OF THE CONCRETE PUMPING SHALL BE MONITORED FROM THE DRAIN OPENINGS TO INSURE TOTAL FILLING OF THE TUNNELS.

AS THE PRESSURE AND DISTANCE RESTRICTS THE FLOW OF CONCRETE, THE INJECTION PORT SHALL BE MOVED TO THE LAST DRAIN SHOWING CONCRETE.

AFTER COMPLETION OF THE TUNNEL SEALING, THE DRAIN TRENCH SHALL BE HYDROBLASTED TO INSURE A SOUND BONDING SURFACE, AND DOWELED TO INSURE STRUCTURAL INTEGRETY.

THE DRAIN TRENCH SHALL BE FILLED WITH CONCRETE AND SCREEDED FLUSH WITH THE BOTTOM OF THE DRY-DOCK.

ALL CONCRETE USED SHALL BE A PROPERLY PROPORTIONED MIXTURE (PER ASTM) UTILIZING TYPE V, NON-SHRINK CEMENT, 3/4" MAXIMUM AGGREGATE SIZE, W/C RATIO NOT TO EXCEED 0.50 . CONCRETE USED TO FILL DRAIN TRENCH SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3000 PSI. TUNNEL FILLING CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 1500 PSI.

ALL CONCRETE SHALL BE ALLOWED TO CURE FOR A MINIMUM OF 28 DAYS PRIOR TO SHORT TERM EXPOSURE TO SEAWATER (3 DAYS) AND 45 DAYS PRIOR TO EXTENDED EXTENDED EXPOSURE TO SEAWATER.

ESTIMATE DESCRIPTION SHEET
SAN FRANCISCO BAY CF-3

| PRI | JOB ORDER NO. | AMEND | REQUEST NO. |
|---|---|---|---|
| 2 | | | |

CUSTOMER:

TITLE: TEST

GENERAL DESCRIPTION OF WORK:

Dry dock #4, tunnel sealing scope.
1. Install outfall forms.
2. Pump concrete through drain openings.
3. Hydroblast collection trench.
4. Install trench dowels.
5. Fill and screed trench.

SPECIAL CONDITIONS:

| PREPARED BY: | TIEDJE.D | REVIEWED BY: | DATE: |
|---|---|---|---|

{ } I CONCUR WITH THE GENERAL DESCRIPTION OF WORK AND SPECIAL CONDITIONS AS DEFINED ABOVE.
{ } I DO NOT CONCUR WITH THE GENERAL DESCRIPTION OF THE WORK AND SPECIAL CONDITIONS AS DEFINED ABOVE. AN AMENDMENT REQUEST IS ATTACHED.

| CUSTOMER SIGNATURE: | | TITLE: | DATE: |
|---|---|---|---|

ESTIMATE SHEET
SAN FRANCISCO BAY CF-4

| PRI | JOB ORDER NO. | AMEND | REQUEST NO. |
|---|---|---|---|
| 2 | | | |

CUSTOMER:

TITLE: TEST

| REF. | JOB PHASE | QTY U/M | HOURS T/C | MATL/EQU COST | LABOR COSTS | TOTAL COSTS |
|---|---|---|---|---|---|---|
| 00012 | 1 RENTAL CONCRETE PUMP TRUCK<br>ENTER NUMBER OF HOURS REQUIRED | 64<br>HR | 0.0<br>00 | 19200 | 0 | 19200 |
| CA002 | 1 INSTALL 4'DIA. FORMS FOR DRAIN PIPE<br>50 S/F | 5<br>EA | 283.1<br>00 | 324 | 16394 | 16718 |
| MC005 | 1 CLEAN AND PREPARE TRENCH FOR CONCRETE | 2000<br>LF | 102.1<br>00 | 340 | 5913 | 6253 |
| MC005 | 1 POUR 1,000 L/F PER DRAIN LINE 48" HIGH<br>USE PREMIXED CONCRETE & PUMP. 250 YDS<br>PER LINE. 6 MAN SCREW X 4 DAYS=192 HR | 500<br>YD | 243.0<br>00 | 40000 | 14072 | 54072 |
| MC005 | 1 POUR AND FINISH CONCRETE TRENCH 8" THICK<br>30" WIDE USE PREMIXED CONCRETE & PUMP | 2000<br>LF | 175.2<br>00 | 18000 | 10146 | 28146 |
| .4 | 1 CORE DRILL BASED ON A 5/8 IN. HOLE<br>2 IN. DEEP INCLUDES MOVING EQUIP.<br>ON 18 IN. CENTERS | 6000<br>EA | 1534.6<br>00 | 1200 | 88869 | 90069 |
| QH006 | 2 ENVIRONMENTAL ENGINEER PREPARE<br>PERMIT APPLICATIONS/JOB SAFETY PLAN(JHA)<br>AND ADMINISTRATE | 1<br>EA | 250.0<br>QH | 0 | 14478 | 14478 |
| QH033 | 2 CODE 953 ENVIRONMENTAL ENGINEER PREPARE<br>CLOSURE REPORT AND RISK ASSESSMENT | 1<br>EA | 350.0<br>QH | 0 | 20269 | 20269 |
| | PAGE SUB TOTALS | | 2938.0 | 79064 | 170141 | 249205 |
| | ESTIMATE TOTALS | | 2938 | 79064 | 170141 | 249205 |
| | CONTINGENCY $ | | 0 | ESTIMATE TOTAL | | 249205 |

ESTIMATE INFORMATION FUNDING DATA SHEET
SAN FRANCISCO BAY 11014/CF-2 (4-86)

| 1.PRI | 2.JOB ORDER NO. | 3.AMEND NO. | 4.REQUEST NO. |
|---|---|---|---|
| 2 | | | |

PART I ESTIMATE INFORMATION AND FUNDING REQUIREMENTS.

| 5. CUSTOMER: | 6. TITLE: TEST |
|---|---|

7. THIS ESTIMATE OF $ 249205 IS FOR ACCOMPLISHMENT BY: 100% PUBLIC WORKS CENTER

( ) FOR ENGINEERING ONLY
( ) ENGINEERING/PLANNING WILL BE PROVIDED AT NO COST TO CUSTOMER.
(X) CUSTOMER MUST REIMBURSE PWC FOR PRE-DETERMINED RATE ENGINEERING. FEE IS $
( ) CUSTOMER MUST REIMBURSE PWC FOR STUDY/PLANNING COSTS ESTIMATED AT $_____
( ) SCOPING ESTIMATE ONLY
(X) FUNDABLE. (X) OFFERED FIXED PRICE. ( ) OFFERED COST REIMBURSABLE. VALID UNTIL 05/16/93

8. FUNDING REQUIREMENTS.

( ) 2275 P.O. IN THE AMOUNT OF .....$_____ FOR _____

( ) 2275 E.A.O. IN THE AMOUNT OF ...$_____ FOR _____

( ) 2276 IN THE AMOUNT OF .....$_____ FOR _____

( ) OTHER IN THE AMOUNT OF .....$_____ FOR _____

| 9. SIGNATURE: | 10.DATE: |
|---|---|

TO: NAVY PUBLIC WORKS CENTER....ATTN: COMPTROLLER

( ) FUNDS IN THE AMOUNT OF $_____ FORWARDED BY THE ATTACHED FUNDING DOCUMENT.
NUMBER | | | | | | | | | | FOR A TOTAL OF $ _____

FIXED PRICE OFFER ACCEPTED : ( ) YES ( ) NO PROCEED WITH _____

| 12. SIGNATURE: | DATE: | 13. ACE SIGNATURE | DATE: |
|---|---|---|---|

PART II PRODUCTION ACCOUNTING DATA (completed by PWC comptroller).

| 14. JOB ORDER NUMBERS | AMOUNT | COMMENTS |
|---|---|---|
| | | |
| | | |

| 15. SIGNATURE: | DATE: |
|---|---|

COMMENTS.

# COST ESTIMATE FOR ALTERNATIVE #2

ESTIMATE INFORMATION FUNDING DATA SHEET
SAN FRANCISCO BAY 11014/CF-2 (4-86)

| 1.PRI | 2.JOB ORDER NO. | 3.AMEND NO. | 4.REQUEST NO. |
|---|---|---|---|
| 2 | | A | 034500021A |

PART I ESTIMATE INFORMATION AND FUNDING REQUIREMENTS.

5. CUSTOMER: EFA WEST

6. TITLE: REMOVE SOIL DD 4, H.P.

7. THIS ESTIMATE OF $ 589105 IS FOR ACCOMPLISHMENT BY: 100% PUBLIC WORKS CENTER

{ } FOR ENGINEERING ONLY
{ } ENGINEERING/PLANNING WILL BE PROVIDED AT NO COST TO CUSTOMER.
{ } CUSTOMER MUST REIMBURSE PWC FOR PRE-DETERMINED RATE ENGINEERING. FEE IS $_____
{ } CUSTOMER MUST REIMBURSE PWC FOR STUDY/PLANNING COSTS ESTIMATED AT $_____
{ } SCOPING ESTIMATE ONLY
{X} FUNDABLE. { } OFFERED FIXED PRICE. {X} OFFERED COST REIMBURSABLE. VALID UNTIL 07/09/97

8. FUNDING REQUIREMENTS.

{✓} 2275 P.O. IN THE AMOUNT OF .....$ 589.105 FOR Specific - Rem

{ } 2275 E.A.O. IN THE AMOUNT OF ...$_____ FOR _____

{ } 2276 IN THE AMOUNT OF .....$_____ FOR _____

{ } OTHER IN THE AMOUNT OF .....$_____ FOR _____

9. SIGNATURE: [signature] 10.DATE: 7-18-96

11. TO: NAVY PUBLIC WORKS CENTER....ATTN: COMPTROLLER

{ } FUNDS IN THE AMOUNT OF $_____ FORWARDED BY THE ATTACHED FUNDING DOCUMENT.
NUMBER _____ FOR A TOTAL OF $_____

FIXED PRICE OFFER ACCEPTED : { } YES { } NO PROCEED WITH _____

12. SIGNATURE: DATE: 13. ACE SIGNATURE DATE:

PART II PRODUCTION ACCOUNTING DATA (completed by PWC comptroller).

| 14. JOB ORDER NUMBERS | AMOUNT |
|---|---|
| | |
| | |

COMMENTS 4090

15. SIGNATURE: DATE:

COMMENTS.

RETURN TO ENVIRONMENTAL GROUP CODE - 950

ESTIMATE DESCRIPTION SHEET
SAN FRANCISCO BAY CF-3

| PRI | JOB ORDER NO. | AMEND | REQUEST NO. |
|---|---|---|---|
| 2 | | A | 0345000021A |

CUSTOMER: EFA WEST

TITLE: REMOVE SOIL DD 4, H.P.

GENERAL DESCRIPTION OF WORK:

Remove Grit From Two Tunnels
Located Bottom of DD 4
Hunters Point, Ca

This estimate is written to provide funding for labor, material, contracts and equipment to accomplish the following work:

Reference: Sketches 0345000021A-S1 & 0345000021A-S2.

Code 950
Write plan, Health and Safety Plan and obtain permits prior to the start of work.

Perform analytical testing and monitoring as required.

Code 967
Coordinate work schedule with the Hunters Point, dry dock 4, contractor (Astoria Metal Corporation).

Coordinate lowering of vac-truck, dumpsters and miscellaneous equipment with the riggers and crane operators (AMC).

Coordinate the location of dumpsters and equipment with AMC.

Unbolt and remove steel covers from the drainage holes of the tunnels in the immediate area of work. Place barracades over unmanned drainage holes. Reinstall steel covers over drainage holes at the end of the work shift.

Use vac-truck to vacuum sand and grit flush and vacuum the grit, dirt and debris from the tunnels. Start at the west end (2 ft. dia. pipe) and work back to the east end. Note: Pipe transends from 2 ft. dia. to 4 ft. dia pipe. Tunnels run on both sides of the dry dock.

Place inflatable plugs on the cleaned side of tunnel to prevent cross contamination. Remove plug and place appropiately in the next section to be cleaned.

Unload vac-truck contents into a temporary holding tank (20 cubic yard dumpster with cover). Pump liquid into another temporary settling tank.

Perform sampling of solids and liquids, have analyzed for metals Title 22.

Remove drained and sampled sand (coordinate with riggers and crane operator). Remove/pump sampled water.

Contact Code 950 to have grit, sand, debris, and water hauled to a proper disposal facility.

ESTIMATE DESCRIPTION CONTINUATION SHEET
SAN FRANCISCO BAY CF-3A

| PRI | JOB ORDER NO. | AMEND | REQUEST NO. |
|---|---|---|---|
| 2 | | A | 038500021A |

SPECIAL CONDITIONS:

Work inside and around dry dock 4, shall be coordinated with the dock side contractor "Astoria Metal Corporation," Jerry Hopper or Mike Harrington at 415-822-5682.

Alternate Method: PWC personnal may use the shops skid mounted hydro blaster to flush the tunnels. The vac-truck can be prestaged top-side along the dry dock, along with dumpsters and miscellaneous equipment.

Due to the nature of this work additional funding maybe required. This job may also be revised as the the conditions may change (ie, flooding the dry dock would cost extra time and money to have equipment removed and shedules rearranged).

| PREPARED BY: PHIL CARROLL | REVIEWED BY: | DATE: |
|---|---|---|

{ } I CONCUR WITH THE GENERAL DESCRIPTION OF WORK AND SPECIAL CONDITIONS AS DEFINED ABOVE.
{ } I DO NOT CONCUR WITH THE GENERAL DESCRIPTION OF THE WORK AND SPECIAL CONDITIONS AS DEFINED ABOVE. AN AMENDMENT REQUEST IS ATTACHED.

| CUSTOMER SIGNATURE: | TITLE: | DATE: |
|---|---|---|

ESTIMATE SHEET
SAN FRANCISCO BAY CF-4

| PRI | JOB ORDER NO. | AMEND | REQUEST NO. |
|---|---|---|---|
| 2 | | A | 034500021A |

CUSTOMER: EFA WEST

TITLE: REMOVE SOIL DD 4, H.P.

| REF. | JOB PHASE | QTY U/M | HOURS T/C | MATL/EQU COST | LABOR COSTS | TOTAL COSTS |
|---|---|---|---|---|---|---|
| H006 | 1 CODE 956 ENVIRONMENTAL ENGINEER COORDINATE WORK APPLICATIONS AND PROCESSES. | 1 EA | 120.000 | 0 | 7025 | 7025 |
| H018 | 1 CODE 952 ENVIRONMENTAL ENGINEER PERFORM SAMPLING AS REQUIRED, REVIEW ANALYTICALS | 1 EA | 120.000 | 0 | 7025 | 7025 |
| H068 | 1 CODE 960 ENVIRONMENTAL PLANNER, SITE JOB, WRITE FUNDABLE & JOB PLAN, COORDINATE WORK PROCESSES WITH ENVIRONMENTAL GROUP. | 1 EA | 120.000 | 0 | 7025 | 7025 |
| H068 | 2 CODE 09A PROVIDE SAFETY SERVICE AS REQUIRED. | 1 EA | 120.000 | 0 | 5024 | 5024 |
| H0025 | 3 COORDINATE WITH CONTRACTOR:WORK SCHEDULE EQUIPMENT PLACEMENT, RIGGING EQUIP IN & OUT OF DRY DOCK, PLACEMENT OF EQUIP. | 1 EA | 240.000 | 0 | 14050 | 14050 |
| H0025 | 3 UNBOLT AND REMOVE STEEL COVERS OVER THE DRAINAGE HOLES OF THE TUNNELS, REBOLT AFTER WORK VAC WORK IS COMPLETE | 1 LT | 120.000 | 0 | 7025 | 7025 |
| H0025 | 3 PLACE BARRICADES OVER TUNNEL OPENING | 1 EA | 40.000 | 0 | 2342 | 2342 |
| H0025 | 3 EQUIPMENT SETUP IN THE BOTTOM OF DRY DOCK. BREAK DOWN AND STORE AT THE END OF EACH WORK DAY. | 1 EA | 60.000 | 0 | 3512 | 3512 |
| H0025 | 3 VACUUM TUNNELS FROM THE DRAINAGE HOLES. APPROXIMATELY 750 CUBIC YARDS | 1 LT | 360.000 | 0 | 21074 | 21074 |
| H0025 | 3 FABRICATE 10 X 4 AND 10 X 6 BELL REDUCER TO USE ON THE VAC-HOSE | 1 EA | 8.000 | 100 | 468 | 568 |
| | PAGE SUB TOTALS | | 1308.0 | 100 | 74570 | 74670 |

ESTIMATE CONTINUATION SHEET
SAN FRANCISCO BAY CF-4a

| PRI | JOB ORDER NO. | AMEND | REQUEST NO. |
|---|---|---|---|
| 2 | | A | 034500021A |

CUSTOMER: EFA WEST

TITLE: REMOVE SOIL DD 4, H.P.

| REF. | JOB PHASE | QTY U/M | HOURS T/C | MATL/EQU COST | LABOR COSTS | TOTAL COSTS |
|---|---|---|---|---|---|---|
| H0025 | 3 PLACE/REMOVE INFLATABLE PLUGS AT APPROP-IATE LOCATION. | 1 EA | 24.000 | 0 | 1405 | 1405 |
| H0025 | 3 UNLOAD VAC-TRUCKS HOLDING TANK. PLACE CONTENTS INTO DUMPSTERS. | 1 LT | 120.000 | 0 | 7025 | 7025 |
| H0025 | 3 PUMP LIQUIDS FROM DUMPSTER INTO SETTLING TANK. | 1 LT | 120.000 | 0 | 7025 | 7025 |
| H0025 | 3 MOBILIZE AND DEMOBILIZE EQUIPMENT, PRIOR TO WORK, DURING WORK IF DOCK IS FLOODED & AFTER THE COMPLETION OF WORK | 1 LT | 160.000 | 0 | 9366 | 9366 |
| H0068 | 3 VAC-TRUCKS | 2 EA | 1.000 | 10000 | 59 | 10059 |
| H0025 | 4 DUMPSTERS, 20 YARD, EXTRA LOW PROFILE FOR LIQUID AND SAND | 1 LT | 26.800 | 12200 | 27 | 12227 |
| H0025 | 4 CONTRACT SUPPORT - POLY-SETTLING TANKS | 1 LT | 1.000 | 2000 | 0 | 2000 |
| H0006 | 4 CONTRACT DISPOSAL COST OF 250 TON OF CONTAMINATED GRIT AND SAND | 1 EA | 1.000 | 93250 | 0 | 93250 |
| H0006 | 4 CONTRACTS TO DISPOSE OF 250 TONS OF CONTAMINATED GRIT AND SAND | 1 EA | 39.600 | 93250 | 0 | 93250 |
| H0006 | 4 CONTRACT COST TO DISPOSE OF CONTAMINATED GRIT AND SAND APPROXIMATELY 250 TONS | 1 EA | 1.000 | 93250 | 0 | 93250 |
| | PAGE SUB TOTALS | | 494.4 | 303950 | 24907 | 328857 |

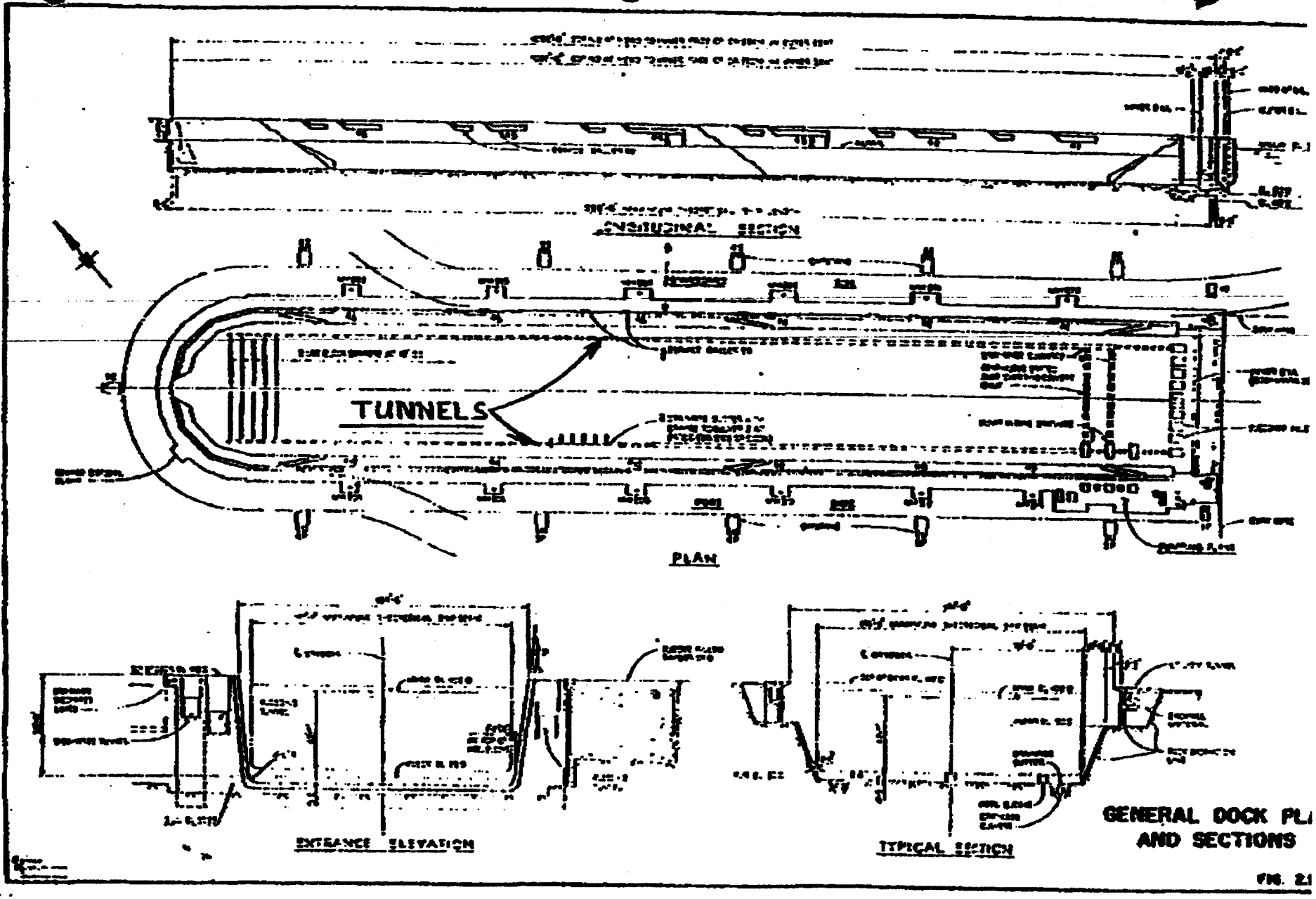
ESTIMATE CONTINUATION SHEET
AN FRANCISCO BAY CF-4a

| PRI | JOB ORDER NO. | AMEND | REQUEST NO. |
|---|---|---|---|
| 2 | | A | 034500021A |

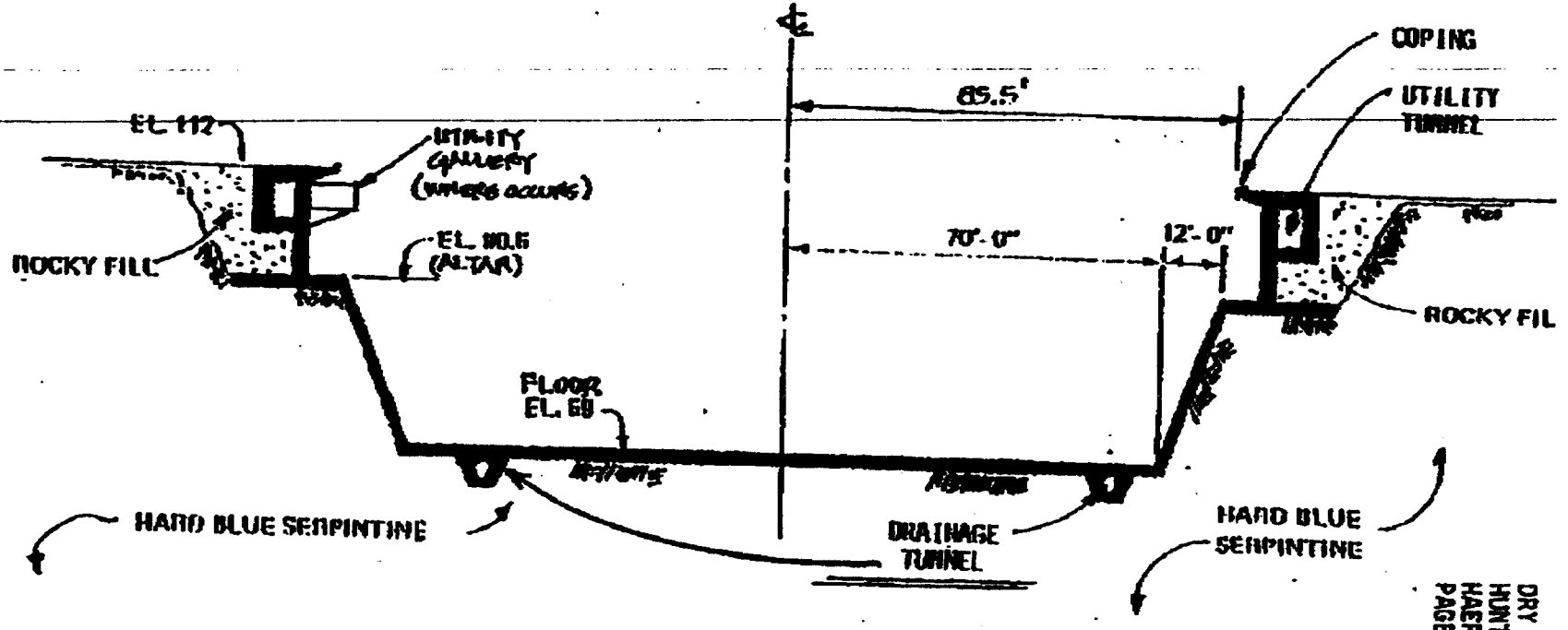
CUSTOMER: EFA WEST

TITLE: REMOVE SOIL DD 4, H.P.

| REF. | JOB PHASE | QTY U/M | HOURS T/C | MATL/EQU COST | LABOR COSTS | TOTAL COSTS |
|---|---|---|---|---|---|---|
| I006 | 4 CONTRACTS TO DISPOSE OF 250 TONS OF CONTAMINATED GRIT AND SAND | 1 EA | 1.000 | 93250 | 1 | 93251 |
| I006 | 4 CONTRACTS TO DISPOSE OF 125 TONS OF CONTAMINATED GRIT AND SAND | 1 EA | 39.600 | 46625 | 0 | 46625 |
| QH006 | 4 CONTRACTS TO DISPOSE OF 10000 GALLONS OF LIQUID WASTE | 1 EA | 39.600 | 12700 | 0 | 12700 |
| QH006 | 4 WORK PLAN TO BE PROVIDE BY MARE ISLAND | 1 EA | 0.100 | 0 | 0 | 0 |
| QH068 | 4 BOS/JOC PROVIDE HEALTH AND SAFETY PLAN | 1 EA | 1.000 | 5000 | 1 | 5001 |
| QH06 | 4 CONTRACT SUPPORT - ASTORIA METAL CORP. PROVIDE RIGGING AND CRANE SERVICES AS REQUIRED TO LOWER & RAISE EQUIP INTO DD4 | 1 EA | 1.000 | 24500 | 1 | 24501 |
| 068 | 4 SPC - OFFICE TRAILER RENTAL WITH RESTROOM AND CLEAN SERVICES. | 2 MO | 2.300 | 3500 | 0 | 3500 |
| | PAGE SUB TOTALS | | 84.6 | 185575 | 3 | 185578 |
| | ESTIMATE TOTALS | | 1887 | 489625 | 99480 | 589105 |
| | CONTINGENCY $ | | 0 | ESTIMATE TOTAL | | 589105 |




SKETCH 034500021A-S1




TYPICAL CROSS SECTION

DRY DOCK NO. 4
HUNTERS POINT NAVAL SHIPYARD
HAER NO. CA-
PAGE

***END***

SKETCH 034-500021A-S2